# Electrical World

AUGUST 12, 1939

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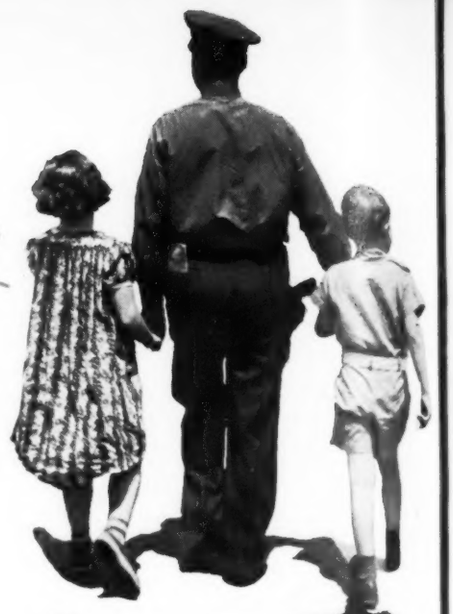

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# Business Opportunity

With the adjournment of the first session of the 76th Congress of the United States American business, specifically the electrical industry, and in that industry specifically the electric utilities, has opportunity to show the American people what for years it has been claiming—that, given a chance, it can create a sound prosperity.

The Congress has tamed TVA.

The Congress has called a halt to subsidized competition against private enterprise in electric service supply.

The Congress has refused to enlarge the money resources of REA.

In matters affecting the electrical industry with less particularity, but with great effect on it nevertheless, the Congress has also lightened the oppressive load.

The undistributed profits tax has been eliminated.

The capital gains tax has been made more equitable and the corporate tax system generally improved.

The taxes for social security have been stopped in their upward climb.

Starts have been made toward the amendment of the Wagner Labor Act and of the Wages and Hours Act to remove their glaring deficiencies.

The Logan bill, first passed unanimously by the Senate, then called back for reconsideration and finally lost in the rush of adjournment, indicates a growing Congressional disposition to curb the arbitrary and irritating powers assumed by certain administrative agencies.

The Hatch Act, drastically restricting the use of federal money and influence in national primaries, conventions and elections, is a most wholesome corrective of a scandalous condition.

The elimination of the "prevailing wage" from relief employment and the eighteen-month provision to emphasize that relief employment must be temporary are also wholesome accomplishments.

And last, but by no means least, there is the utter defeat of the spending philosophy by the failure to pass the Administration's bill to enlarge the pipe line to the treasury.

In the few months that will intervene before the Congress is called into session again business has its chance.

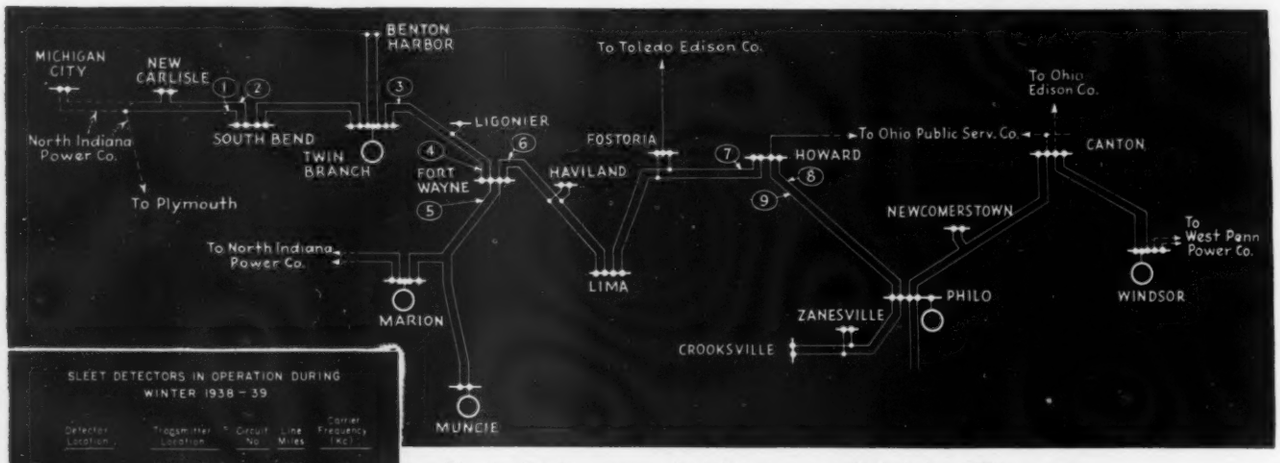
Effort must be made right now to prove that business and industry can use the immense accumulation of capital that lies idle and ready on call. A significant increase in employment in industry and commerce must be accomplished. Not only must business put men and money to work, but business must make it crystal clear to the public mind that the improvement results from the relief that the Congress has given and has promised from government exactions, interferences and competition. This is tremendously important to assure that the Congress will not reconvene next January in the mood to say, "Well, we gave business a chance and conditions are no better than they were."

So far business seems to be giving a good account of itself. Buying has increased, production is up, employment better, killowatt-hour output at new peaks. The utility industry particularly is going ahead rapidly. If the upward swing, which started seven weeks ago, can be maintained and accelerated, the American public will once more believe that the old-fashioned brand of economics—spend no more than you earn, balanced budget, supply and demand, work and earn, etc.—are probably best after all.

# Carrier Attenuation Discloses Glaze Formation

***Relatively simple addition to carrier relay receiving circuit indicates glaze accumulation on conductors and helps to decide when to detach the line and short circuit to melt off ice***

**G. G. LANGDON** *and* **V. M. MARQUIS**, *American Gas & Electric Service Corp., New York*




SLEET DETECTORS IN OPERATION DURING WINTER 1938 – 39

| | Detector Location | Transmitter Location | Circuit No. | Line Miles | Carrier Frequency (Kc) |
|---|---|---|---|---|---|
| 1 | South Bend | Michigan City | — | 40.2 | 110 |
| | | Plymouth | | 54.0 | |
| 2 | South Bend | New Carlisle | — | 17.0 | 150 |
| 3 | Twin Branch | Fort Wayne | 1 | 65.4 | 100 |
| 4 | Fort Wayne | Twin Branch | 2 | 65.4 | 150 |
| 5 | Fort Wayne | Marion | — | 59.2 | 130 |
| 6 | Fort Wayne | Lima | 1 | 63.2 | 69 |
| 7 | Howard | Fostoria | 1 | 44.9 | 100 |
| | | Lima | | 89.5 | |
| 8 | Howard | Philo | 1 | 80.6 | 110 |
| 9 | Howard | Philo | 2 | 80.6 | 85 |

**Fig. 1—Carrier current sleet detectors installed during 1938 on nine 132-kv. circuits of the American Gas & Electric Company**
Of an experimental nature and installed on sections in Indiana and Ohio where sleet is most prevalent, these sleet detectors proved to be of great help in combating sleet and it is planned to install detectors on other sections of the system during the current year.

AT NINE STATIONS and junctions on the American Gas & Electric Company system the carrier-relaying equipment is being used successfully to give an indication of the presence and degree of accumulation of ice on the conductors. A relatively simple addition to the carrier-receiving apparatus reveals the progressive attenuation in sections where the glaze is forming. The technique has been useful in improving the service continuity of the 132-kv. lines during the glaze season.

Experience in the prevention and removal of conductor glaze on high-tension transmission lines on an interconnected power system were described in a recent article. That article described how glaze formation on long 132-kv. lines could be melted both at normal voltage and without resort to the sectionalizing of generators or to the use of special transformers for melting conductor glaze.

If melting of glaze on transmission lines is to be done in time to insure continuous performance of transmission lines during sleet storms, it is essential that a dependable means of detecting the presence and severity of sleet conditions on any section of line be provided to serve as an accurate guide for melting. Once glaze is formed on the conductor a light wind may bring about "dancing" of conductors, which often results in conductor burn-downs. Therefore, if trouble or loss of line is to be avoided, it is really necessary to melt glaze early, before it gets too heavy. Furthermore, if ice is still forming, delay in melting means a greater thickness on the conductor and hence a longer time required to melt.

It is not particularly difficult to determine when to melt if conductor glaze occurs uniformly throughout the length of a line and if it can be seen at the terminals of the line. However, experience has shown that sleet is frequently confined to a relatively restricted area and, while there may be no evidence of glaze formation at the termini of the line, there may be a severe sleet condition at points on the line remote from the terminal points. Quite often glaze formation occurs at night, which, together with the often accompanying impassable condition of roads, makes detection of sleet by inspection in remote sections definitely unsatisfactory if not impossible, at least until night passes. Even by day bad roads offer a handicap to successful inspection. Also, even though sleet may be found by inspection, the sleet storms may put telephone circuits out of commission or may be so remotely located that there is bound to be delay in getting word to the dispatchers. The use of two-way space radio on mobile units, while offering some help in overcoming this latter difficulty, is only partially satisfactory.

Because of these difficulties in detecting sleet a great deal of work has been done on the system with which the writers are associated in evolving a method of sleet detection which would be dependable and which would eliminate the necessity of line inspections. In the early stages it was proposed that a test conductor be located in the switchyard; however, this was obviously unsatisfactory for the reason already mentioned—that is, there may be glaze on the conductors only at points remote from the terminals of the line. Consideration was given to the use of dewpoint meters, but this method, even though it could be used as a guide for forecasting sleet occurrence, had the same disadvantage of not covering the entire line.

### *Existing Carrier Equipment Used*

Finally, the idea of using carrier-current transmission as a means of detecting sleet was evolved. An analysis of past experience with carrier showed that carrier-current transmission over high-tension lines is affected appreciably by the presence of sleet on the line. Several sleet detectors were therefore built, installed and actually used on a group of 132-kv. lines of the Central System of the American Gas & Electric Company. The results were highly satisfactory during the last sleet season. The initial installation was made in 1938 on the section of the 132-kv. system where sleet is most prevalent. From Fig. 1, showing the location of the lines, it will be seen that detectors are now located on nine 132-kv. lines varying in length from 17 to 90 miles and operating at carrier frequencies ranging from 69 to 150 kc.

In the past any use of carrier-current equipment involving the measurement of the magnitude of the carrier voltage received has been avoided due to the many variable factors present, including among them the attenuation due to sleet. Consequently, in applying the principle of measuring received signals to sleet detection, precaution had to be taken to minimize all variables except carrier attenuation, due to sleet within any line section. While the use of separate transmitters and receivers as well as the incorporation of sleet detection on carrier-current telephone and carrier-current metering equipment was considered, it was not attempted on the system with which the authors are associated primarily because of the existence of carrier-current relaying equipments which adapted themselves more readily to sleet detection, due to the following advantages:

(a) The line trap units which are

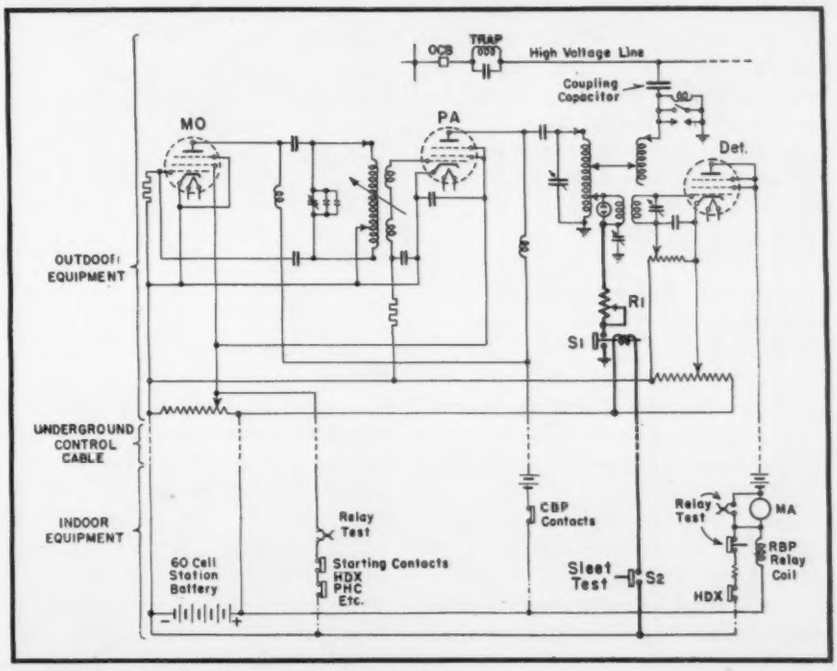



**Fig. 2—Sleet detector circuit of carrier receiver**

The equipment added to the standard carrier relay receiver is shown in heavy lines. No changes were made in the transmitters. Sleet readings are normally taken in exactly the same manner and at the same time as the regular carrier relay readings. After the operator at the receiving station obtains the relay reading he momentarily depresses the sleet push button *S-2* to obtain the sleet detector reading. In actual operation the sleet push button closes relay *S-1* installed in the outdoor cabinet, which diverts a part of the incoming carrier signal to ground through an adjustable resistance *R-1* and in this manner changes the receiver adjustments from the regular setting to the sleet detector setting as explained in Fig. 3. Normally these readings are taken once each shift, but during weather conditions which indicate the possibility of glaze readings are taken as often as necessary to determine conditions on the line.

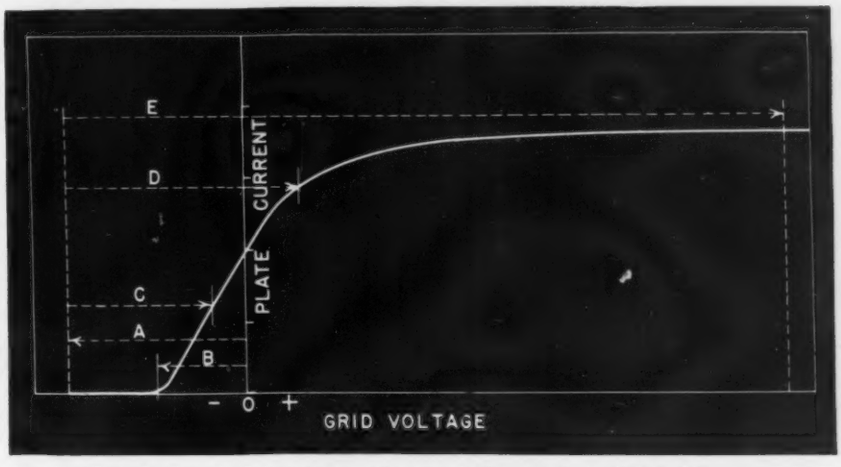



**Fig. 3—Typical operation of detector tube for relaying and sleet detection**

A—D.c. fixed bias of receiver tube (approximately two times cut-off).
B—D.c. cut-off point of detector tube.
C—R.F. signal required to pick up relay.
D—Normal R.F. input for sleet detection is set at this point by adjusting *R-1* (see Fig. 2). Any further reduction in received carrier voltage causes a corresponding reduction of plate current, thus the amount of the plate current reduction below this normal condition is a measure of the additional losses resulting from sleet.
E—Typical R.F. input for relaying. "E" under normal conditions is effectively not less than five times C; that is, the input volts can be reduced at least five to one before plate current is lowered to the pick-up value of the relay. Variations in input amounting to two or three to one do not appreciably affect the plate current.

a necessary part of carrier-current relaying tend to minimize the effect of switching conditions outside the particular section of the line that was involved, consequently a measurement of received signal level should indicate conditions within the section.

(b) Carrier relaying operates at a relatively high energy level, which makes a highly sensitive detector unnecessary.

(c) Routine testing with sleet detectors is simplified and the routine carrier relay tests provide a cross-check on most of the equipment used in sleet detection.

(d) The additional equipment required is inexpensive and easily installed.

The comparatively simple circuit worked out for adding the sleet detector feature to the carrier-current relay sets is shown in Fig. 2. It will be noted that it is only necessary to install a relay, a resistor and a push button at the receiving end. The carrier relay sets are used without alteration for transmitting the signal.

In Fig. 3 is shown a typical characteristic curve of the carrier-current relay detector and the adaptation of this characteristic curve for both relaying and sleet detection.

### *Operating Experience*

The sleet storms which occurred during the past winter provided at least one practical test on each of the detectors that had been installed and several tests on some of them. Advantage was taken in each of these cases to correlate the detector readings with actual sleet conditions on the lines. It was realized that the detectors on different lines would perform differently under similar glaze conditions, due to such variables as length of line, carrier frequency, detector adjustment, type of set and other factors, and that in all probability each detector must be calibrated by actual sleet experience. While a complete experience record under varying sleet conditions is not absolutely necessary for detecting the presence of sleet, any such information should be valuable in giving the operating man a better means of interpreting readings in the future. Again, it was considered desirable to determine for each detector any variations caused by conditions other than sleet, snow, etc. A routine was, therefore, set up for taking and recording sleet detector readings at the same time the routine carrier relay tests were made.

In addition to sleet detector readings, weather observations must be carefully considered and analyzed if the operator is, on the one hand, to avoid melting ice when unnecessary or, on the other hand, to melt it as

[*Continued on page 100*]

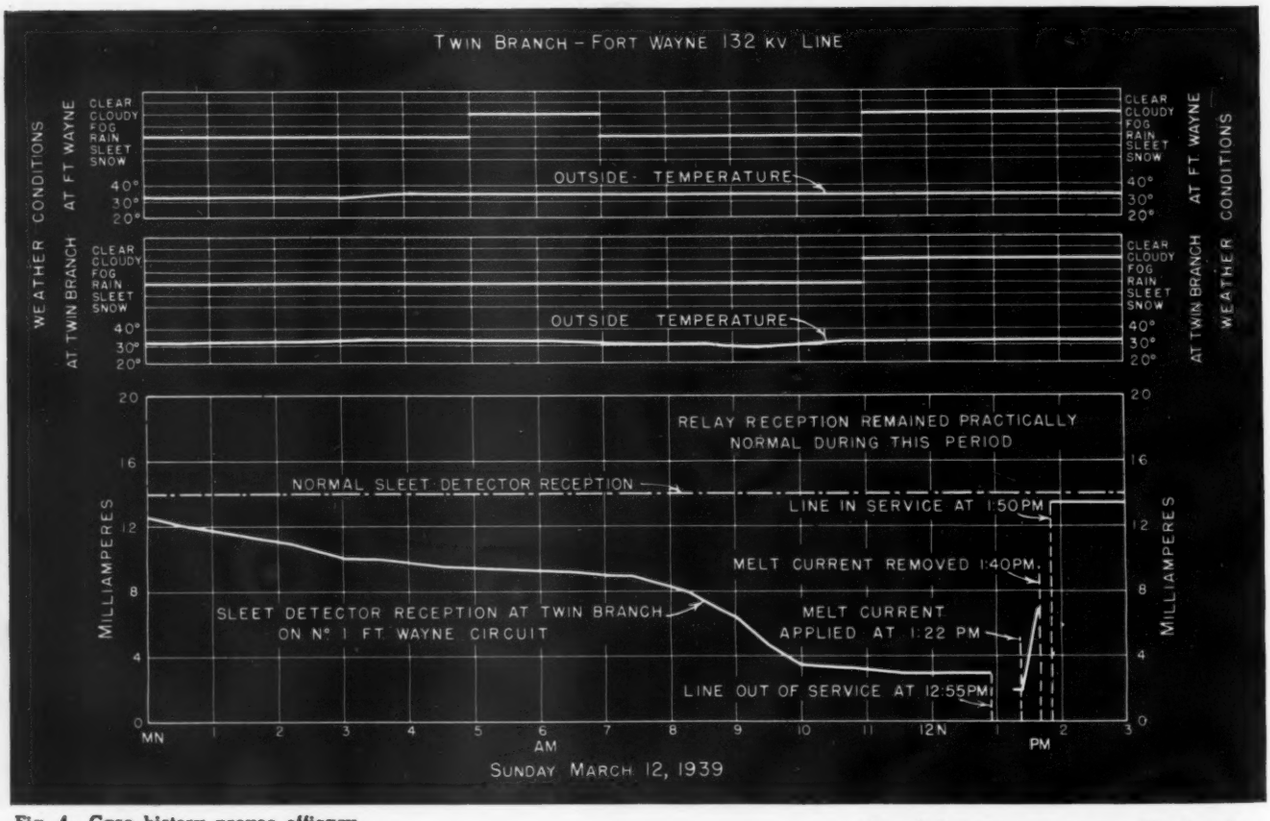



**Fig. 4—Case history proves efficacy**

Sleet detectors indicated slight ice formation on the Twin Branch-Fort Wayne line shortly before midnight on Saturday, March 11, 1939. The readings continued to decrease gradually during the remainder of the night. It is interesting to note that it was raining both at Twin Branch and Fort Wayne stations and no ice was forming at those points. By morning, inspection showed ice was forming at Riverside on the Twin Branch-Riverside lines (which were not equipped with sleet detectors). This line was watched closely and patrolled by short-wave radio car. Sleet conditions on the Twin Branch-Riverside line continued to become worse, and since there was no indication that the Twin Branch-Fort Wayne line was yet in serious danger, it was decided to melt the conductor glaze from the former lines first. By 11:31 a.m. these lines had been cleared of ice and sleet-melting current was next applied to the No. 2 Twin Branch-Fort Wayne circuits. Shortly afterward radio patrol car located the ice formation between Elkhart and Goshen on the Twin Branch-Fort Wayne line. Further investigations showed about $\frac{1}{2}$-in. of ice tapering to $\frac{1}{8}$ in. 4 miles either way from tower No. 76, which is about 20 miles from Twin Branch. As soon as this circuit was back to normal the sleet was melted from No. 1 Twin Branch-Fort Wayne circuit. The graph shows the sleet detector readings taken on the No. 1 circuit.

# Capacitors Ease Peak on Municipal System

***Sudden demands by Decatur's industrial plants tax kva. capacity and voltage capabilities — Large expenditures for lines averted by corrective installation***

**G. L. HODDY,** *General Electric Company, Cleveland, Ohio*

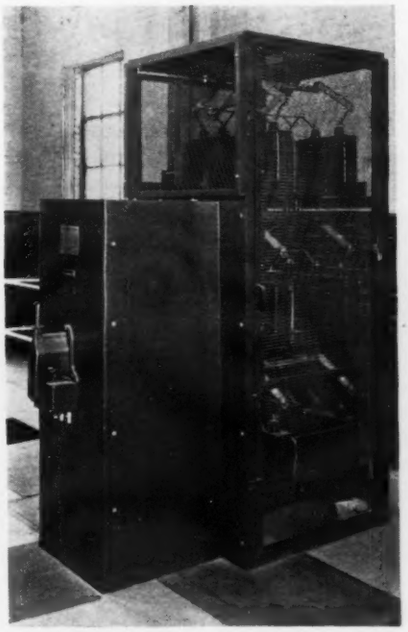
**M. J. MYLOTT,** *Superintendent Electric Light Department, Decatur, Ill.*

THE CITY of Decatur had the opportunity to increase the kilowatt-hour output of its power plant by 20 per cent and to do its largest power customer a real favor. To do this, however, required carrying a load of 4,460 kva. on a station rated at 3,750 kva. maximum capacity. Furthermore, the additional load must be carried on two lines which were already overloaded. The problem was to decide on a course of action and prepare for the additional load in less than two months' time. How capacitors solved the problem is covered by the following story.

In the fall of 1937 a general survey had been made of the power plant and distribution system of the city of Decatur to determine a program of future expansion. The generating equipment consisted of machines rated 2,500, 1,250, 3,750 and 625 kva. at 0.8 power factor, 2,300 volts, three phase, 60 cycles. There was sufficient boiler capacity to operate the 2,500-kva. and the 1,250-kva. machines for normal operation or the 3,750-kva. machine for standby service. However, the boiler capacity was not sufficient to operate the 625-kva. machine in addition, so the station capacity was definitely limited to 3,750 kva.

The load at the time on the station was 2,620 kva. This was a decrease from a peak of 3,720 kva. which had been recorded earlier in the year, before the general business recession had set in. On this basis it was proposed that an addition to the boiler capacity be made late in 1938 or in 1939.

The survey further showed that capacitors would improve the distribution system materially from the standpoint of voltage regulation. However, other changes in the circuits were also indicated and it was decided to make these changes before adding the capacitor.



**One bank of capacitors at the power plant** Ordinary capacitors are put out on the lines. Here the limitation of plant kva. capacity warranted an installation at the plant to give control over power factor and reactive. These are General Electric class LR indoor, large rack type capacitors, 225 kva., 2,300 volts, three phase, 60 cycles.

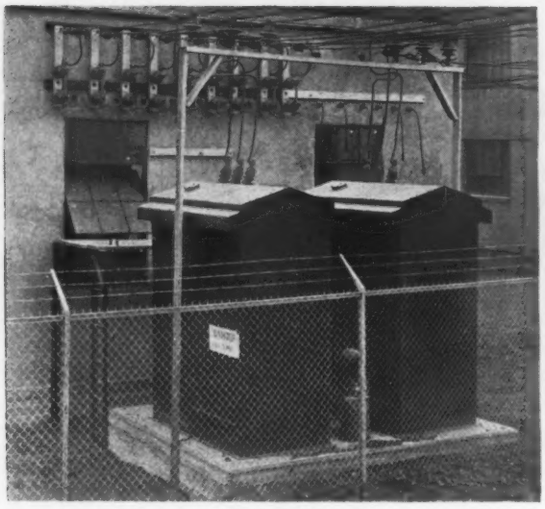
Everything was running smoothly when in July, 1938, the McMillen Feed Company advised the city of Decatur that the boilers at the Central Sugar Company, its subsidiary, were in such shape that they would not be able to handle the 625 kva. load over the coming sugar beet season. Furthermore, the Central Soya Company, another subsidiary, would require an increase of 620 kva. to handle the soya bean crop in the fall. Already the plant load had increased to 3,075 kva. due to improved business conditions. Rough calculations showed that a load of 4,460 kva. at 74 per cent power factor could be expected by September 15. Furthermore, a peak load of 4,960 kva. would be possible if other business should recover to normal.

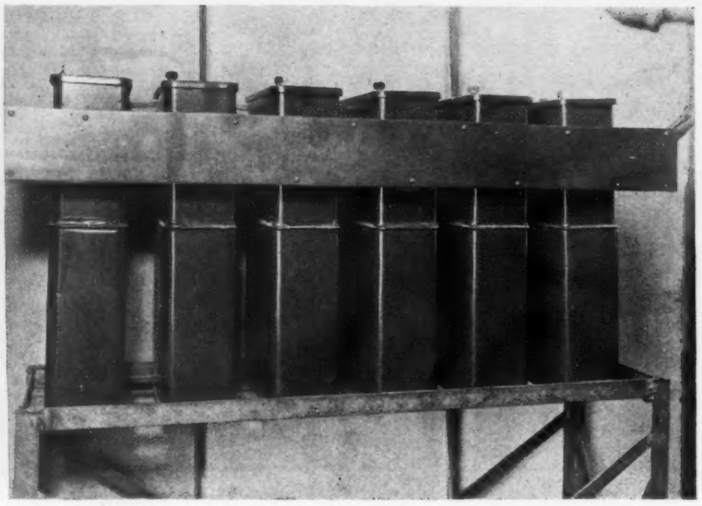
The McMillen Feed Company and its subsidiaries were supplied by two parallel circuits with a combined capacity of 1,730 kva. The present load of 1,230 kva. was well within this capacity. With the addition of the proposed load, the total load would amount to 2,500 kva. at 72 per cent power factor. By making a change in a short run of cable on one of these circuits the combined capacity of the two lines could be increased to 2,460 kva. This would not be satisfactory, however, from a voltage regulation standpoint because the delivered voltage with the present load was only 2,200, and the additional load would depress the voltage still further to 2,090, which would be far from satisfactory. By the installation of a third circuit, at an approximate cost of $15,000, it would be possible to raise the delivered voltage to 2,180 with the additional load.

### *The Solution*

In the previous survey it had been shown that capacitors, besides improving voltage regulation, would release feeder and generating capacity by improved power factor. Certainly here was an opportunity to see what capacitors would do.

It was immediately found that while the turbo-generators were rated at 0.8 power factor, there was enough additional capacity in the turbines to carry the full kva. rating at unity power factor. To reduce the expected peak load of 4,960 kva. at





**Capacitors at industrial plants**
Left—McMillen company. Two G.E. class LR large rack type, each rated 360 kva., 2,300 volts, three phase, 60 cycles.
Right—Central Soya Company. Six G.E. class EDT inclosed dust-tight capacitor units, each rated 15 kva., 460 volts, three phase, 60 cycles.

74 per cent power factor to 3,750 kva. at unity power factor would require 2,400 kva. in capacitors. In case the peak load did not exceed 4,460 kva. it would be possible to get by with as little as 1,665 kva. in capacitors.

With the addition of 1,080 kva. of these capacitors to the two circuits to the McMillen company it would not be necessary to construct the third line as the voltage would be better even with the additional load than at present.

### *Capacitors Purchased*

On the basis of these figures it was decided to purchase 1,665 kva. of capacitors, at a cost of $13,500, immediately so as to take care of the present crisis. The rest of the 2,400 kva. of capacitors could be installed later, after the general distribution system had been changed. For this reason this 1,665 kva. of capacitors would be allocated to the concentrated load part of the system. An order for this amount of capacitors was placed on August 9, 1938. By September 12 the entire amount was completely installed and connected ready for the increase in load. Thus, in less than two months' time the station capacity had been increased approximately 20 per cent with an expenditure of less than it would have cost to build a third line to the McMillen company. To have increased the boiler or generating capacity of the station would have required an expenditure of $200,000 or more and no results could have been expected in less than a year.

In order to get the maximum benefit from the capacitors the total installation was split up into various size units and located at strategic points. Four groups, totaling 1,080 kva., were installed at the McMillen company; two units of 360 kva. each were located outdoors at the junction of the two 2,300-volt circuits to the McMillen company; circuit breakers were provided so that the power factor can be controlled on these circuits; 180 kva. of capacitor was located in another outdoor rack on the 460-volt side of a 300-kva. transformer bank to boost the voltage at that point; the remaining 180 kva. was purchased in 15-kva., 460-volt box-type units and located on the 460-volt distribution system to boost the power factor on the secondary system.

Two other circuits from the power station furnish power to the General Electric Company plant; synchronous motors at this plant maintain a fair power factor on the secondary distribution system; 360 kva. of the 2,300-volt indoor type was located on the incoming line at this plant; a switch is provided for cutting this capacitor in or out, depending on the load on the system; the remaining 225 kva. of capacitor is located in a 2,300-volt indoor rack located in the power house; this gives the power station operator a certain amount of control over the station load power factor.

Five other circuits from the power house supply power to the industrial business and residential sections of Decatur. A power factor meter has been installed on the switchboard at the power house and jacks arranged so the power factor of any one of the circuits can be read instantly. Other metering is arranged to show the current on each circuit. By this means the load distribution on the system can be watched to determine where capacitors are needed. On the basis of data collected with this metering it is hoped that the other portion of the 2,400 kva. of capacitors can be distributed in pole type units when it is eventually purchased.

### *Results*

Since this capacitor has been installed the load has increased from 2,270 kw. to 3,300 kw. demand. (The peak demand a year previous had been 2,750 kw. The revenue load from the McMillen Feed Company has increased from 600,000 kw.-hr. to more than 1,000,000 kw.-hr. per month. This means a revenue increase of approximately $3,200 a month to the city of Decatur. Furthermore, the $13,500 invested in capacitors eliminated the necessity of an expenditure of $15,000 for the construction of a third line to the McMillen company. Better voltage is supplied to the McMillen plants and the General Electric plants. This means more efficient operation of motors and heating devices.

Power supply to the McMillen plants is metered at the power station and the power losses in the two circuits to their plants are charged to them. The improved power factor on these lines will bring about a reduction of current and decreased copper loss which should amount to a saving of $3,300 each year. A fur-

[*Continued on page 102*]

# Machine Shave, Sterilize, Sapwood to Stop Cedar Pole Sap Rot

*Sapwood thickness controlled and sterilized in attempt to prevent sap rot and extend above-ground life of Western cedar poles — New high-speed pole shaver described*

**EARLE D. LYON,** *Assistant Line Installation Engineer Commonwealth Edison Company, Chicago*

ALTHOUGH experience confirms the fact that the butt of a Western red cedar pole treated by modern methods to give ½ in. creosote penetration is preserved for a service life of at least 35 years, sapwood deterioration in the form of shell rot above ground frequently cuts pole life far below this figure.

In an attempt to curtail shell rot and bring the life of the out-of-ground portion of poles into closer agreement with butt life Commonwealth Edison Company is now using full-length, machine-shaved, creosote-dipped Western red cedar poles for overhead line construction in the city of Chicago. Specifications for these poles require removal of sapwood in the above-ground area to less than ½ in., followed by a fifteen-minute immersion in creosote at 170 to 180 deg. F. to sterilize the remaining sapwood.

Shaving of the poles is done by the pole producer with a lathe-like high-speed shaving machine that produces a smooth, uniformly tapered or "streamlined" pole having a controlled sapwood thickness. This machine, a recent innovation in the processing of Western red cedar poles, is described in this article.

### *Creosote Applied*

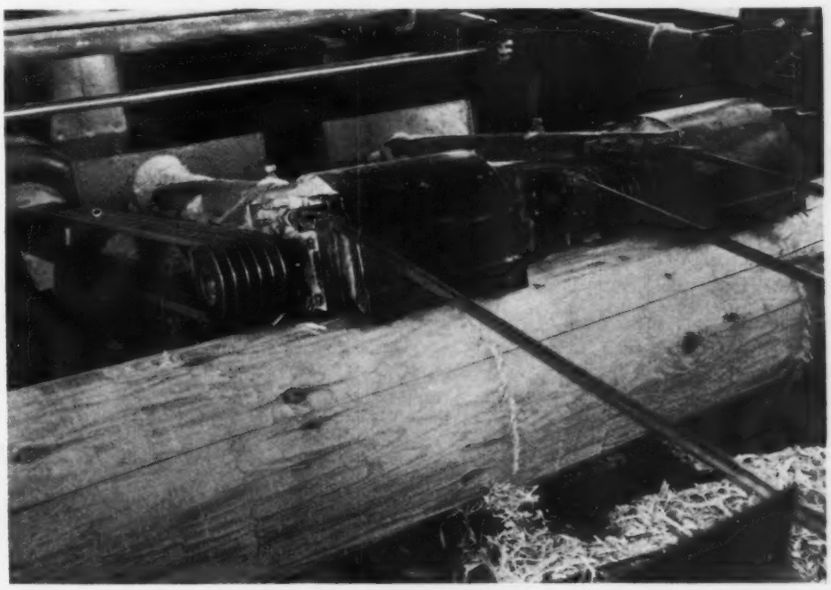
Besides impregnating and thoroughly sterilizing the surface of the remaining sapwood by immersion in hot creosote, the process enables the shaved surface to rid itself of accumulated moisture by evaporation at such a rapid rate as to maintain the moisture content of the sap ring below that required for fungus growth. It insures partial penetration of the remaining sapwood throughout the entire pole, stains the surface uniformly and offers complete protection in checks, cracks, grains, bolt-holes, etc. The slight retention permits free breathing of the pole and prevents bleeding.

To the lineman the dry sapwood offers a secure anchorage for gaff points since they will come in contact with the solid heartwood underneath. Moisture pockets which invariably result from climbing will be reduced to a minimum in depth and water that does collect in these will evaporate before decay sets in.

Despite the additional investment involved in processing this new pole, indications are that there will be no material increase in the cost to the consumers due in part to the fact that the number of poles declassed by removal of sapwood in the above-ground area is surprisingly small with the new pole-shaving machine.

Early experience with Western red cedar indicated that ½ in. creosote penetration was quite satisfactory in preventing decay or heartwood rot in the ground-line area. However, data accumulated in connection with the regular pole test (ELECTRICAL WORLD, February 27, 1937) revealed that out of 535 poles tested at various locations 48.4 per cent showed some degree of sapwood rot in the above-ground portions. The average life of these infected poles was thirteen years. They had been painted with linseed oil paint.

Sap-rotted areas ranged from small, scattered patches throughout the length of the pole to the entire untreated or above-ground portion, although the infection seemed ordinarily to occur near the top of the pole. In most cases the disintegration of the deeper layers of sapwood was concealed by a deceptive shell of sound wood approximately 4/10 in. in thickness around the outside of the



**Modern high-speed pole shaver removes excess sapwood from Western red cedar poles. Pole is revolved and fed past these stationary shaving heads from right to left. High-speed knives of the right hand head make the initial cut, the left one makes finishing cut. Resulting pole is smooth, round, and perfectly tapered**

**Shaved poles are hot dipped in creosote at 170-180 deg. F. for fifteen minutes. After creosote is withdrawn poles are ready for butt treatment**

pole. In more advanced cases the sap-rot broke through this shell and appeared on the outside surface. In cases where sap-rot had broken through to the outside surface it was found that decay had made considerable advance in the outer heartwood. In practically all instances the poles affected were those having thick sapwood, while poles operating under the same conditions but having a thin layer of sapwood (less than ½ in.) showed no indications of sap rot.

### *Shave Standing Poles*

Though sap-rot did not reduce the strength of the pole appreciably, since practically all poles are above minimum specifications, it did constitute a hazard to linemen and was decidedly unsightly. Consequently, a great many of these poles were shaved in service in the field to remove the decayed portion of the sapwood and the shaved surface was repainted with linseed oil paint. Other poles were shaved and scorched before the paint was applied in an effort to sterilize the remaining sapwood and thus prevent further advance of decay. Unfortunately, the linseed oil paint which was used appeared to form a seal, preventing breathing of the pole and thereby aiding in the retention of moisture and promoting further decay. Later, in lieu of paint, a creosote stain was tried on these shaved areas in the field, but the results were discouraging because all fungus growth was not destroyed, especially in checks in the face of the pole around knots, bolts, etc., and the shaving operation therefore offered only temporary relief.

Because thickness of sapwood appeared to have a bearing on susceptibility to sap-rot, measurements were made on about 3,700 Western red cedar poles to determine the average, maximum and minimum thickness of sapwood. These poles were selected at random, included all sizes, and all measurements were taken at the tops of the poles. Thickness of sapwood over the entire group tested ranged from ¼ to 1¼ in., resulting in an average thickness of $1\frac{1}{16}$ in.

Since it was recognized that sapwood is much more susceptible to decay than heartwood, especially under proper conditions of temperature and moisture, and since actual experience has shown that those poles having thick layers of sapwood were more readily affected by sapwood rot, the conclusion was reached that by removal of a portion of the outer sapwood before putting the pole in plant would make it less susceptible to fungus attack.

Consequently, in 1934, the full-length, hand-shaved, creosote-stained pole was adopted as a standard by this company. The length of time that these poles have been in plant to date is too short to draw any definite conclusions or to acquire accurate data concerning their immunity to sap-rot in the above-ground area. However, the excellent appearance of these poles at the present time justifies the belief that this was a step in the right direction and has resulted in a healthier pole.

Although the hand-shaved, stained pole possessed decided advantages over the unshaved, painted pole, the result was far from perfect. The shaved surface was irregular, especially where knots were encountered, and on poles having extremely thick sapwood it was impracticable to reduce it to the desired thickness by this method.

### *The Pole Shaver*

In order to meet the need for a more practical and efficient way of controlling sapwood thickness in poles the modern pole-shaving machine previously mentioned has recently been put into operation by one of the pole producers. This machine is electrically operated and is entirely automatic. As the pole is fed through the machine spirally by means of solid rubber-tired driving wheels, speed of which is controlled by the operator, two sets of shaving knives, cutters of which turn at 3,600 r.p.m., remove the desired thickness of sapwood. These knives are adjustable and are set to remove a definite thickness of sapwood from each pole. This thickness is maintained throughout the length of the pole. The lead-

[*Continued on page 103*]

**This Western red cedar pole has been in service ten years—note advanced sap-rot**

# One-Minute Service on Connects and Disconnects

***Kansas City Power & Light strengthens customer relations by fast, ultra-modern system of customer records—Provides pleasant contacts for 57,500 personal calls per month and 275 telephone calls per day***

**H. C. DAVIS**, *Assistant Secretary and Assistant Treasurer, Kansas City Power & Light Company*

A CREDIT RECORD in 28 seconds—a telephoned application for a service connection or disconnection in less than one minute—a receipted bill and the proper change in 30 seconds for a customer who appears in person to pay the monthly service bill—and it's all done with a smile and no appearance of haste. These are some of the features of the customer contact departments of the Kansas City Power & Light Company that have been developed to meet the modern demands for speed and service.

The impression of the general public with respect to the efficiency and fairness of a business organization is gained through the experiences of individuals in personal contact with the organization. For this reason we believe no effort is too great to make those contacts pleasant for our customers. In the course of the average business day 275 customers telephone the service department of the company with requests for connection or disconnection of service and each month more than 2,500 call in person with similar requests. Another 55,000 call in person each month to pay their service bills, so that a surprisingly large percentage of the total number of customers of the company make some personal contact with one of these departments monthly.

When the customer enters the attractive street floor display room in the new building of the company to pay his service bill he is confronted by six receiving windows. Behind at least two of these windows at all times, and behind each one when necessary, experienced and well-trained tellers are ready to serve him. Each teller is equipped with a small electric adding machine, an electric perforating machine and an automatic changer, modern business devices that enable the teller to hand the customer a receipted bill and correct change in 30 seconds.

H. C. Davis

### *Sixty-second Service Orders*

Should the customer's call involve a request for connection or disconnection of service the customer is directed by a girl at the information desk just inside the street door to one of the six service desks on the same floor, seated in a comfortable chair beside that desk and asked his name and his old and new address by a pleasant young man. Unless the credit rating is poor, he is able to leave that desk in less than a minute with the assurance that the service ordered will be instituted within half a day.

While seated at the desk, the customer is aware of only three of the several activities set in motion by the call. He sees the service desk clerk press one of a row of keys on an instrument panel on his desk, hears him speak the name and address into a dictograph and sees him take a service record card from a pneumatic tube from one of the drawers of his desk. However, a somewhat complex but smoothly operating system functions behind the scenes to make that efficient, fast and seemingly simple service possible.

When the clerk at the service desk pressed the key on the instrument board on his desk and lifted the dictograph instrument a signal appeared in the service file department on the third floor, a file clerk threw another key and the voice of the person at the service desk was audible through loud speakers. The file clerk took a service card, filed according to geographical location, from the file and placed it in a pneumatic tube which is directly connected with the service clerk's desk. There the service order was made on the card. At the same time connection had been made, by the same method, with the proper section of the credit file and the name and former location were repeated for the credit file clerk. If the credit rating of the customer was found to be satisfactory a signal was flashed and a green light appeared on the dictograph cabinet at the service clerk's desk. If the credit rating was not satisfactory and additional information or new security was needed a red signal was given. This system makes it possible to communicate credit ratings without audible or written reports.

If the customer makes the service application by telephone the order is first taken by the regular PBX oper-

**Fifty-five thousand customers per month pay service bills to these cashiers. Note electric perforator (1), change maker (2) and electric adding machine (3), which reduce contact time to 30 seconds**

**Step 1 and step 3—The representative is pushing a key which signals the service files and credit department. If customer's credit is satisfactory the customer's service card is at this desk, via pneumatic tube, and a green light has been flashed**

**Step 2—Clerks operating the four sections of the geographical service file send service cards down the tube as shown at left and receive and enter telephoned orders**

ator, who learns the location where service is desired and routes the call to the proper section of the file. Twelve direct lines from the PBX board have terminals at the service files. They terminate in groups of three, at four sections of the file, with two plugs and key cabinets at each section. The operators in the service file room wear breast type telephone sets and plug in and intercept calls at each station. The file clerk secures the necessary information from the customer and records the order on the service card in the same manner as the service desk man. The connection orders are routed through the credit department so they indicate credit arrangements.

### *Geographical Service File*

The service file is the visible index flat card type. Each record is made up of two portions, a folded sheet which remains in a visible pocket as a permanent record and an 8x5 removal card which is inserted in the folded portion for filing. The file is set up as a location file by alphabetical and numerical listing of streets and avenues. Each meter loop connected to the company's lines is represented by a file set. Each card serves as an application and service order for a succession of four customers at one location. On the permanent insert provision is made for ten such changes. The service card gives the room count record for residential service, meter number and constant, size of meter loop and load connected, in addition to application and order information. On the margin of the file insert is the address and account number, meter and service information and type of occupancy. The main body of the form carries the name of the customer, the date of connection and disconnection and the meter reading and rate. When service is connected the service card is placed in the file pocket with the top margin of the card up; when disconnected, in the reverse order. When the bottom margin of the card is up a red spot appears so the clerk may determine at a glance the exact state of any service location.

The credit record is a separate file of the same type, using a folded card in a 6x4 pocket. It is set up on an alphabetical code basis, phonetically filed and carrying a complete record of the customer at each location

[*Continued on page 104*]

# Commercial Water Heating Application Engineering

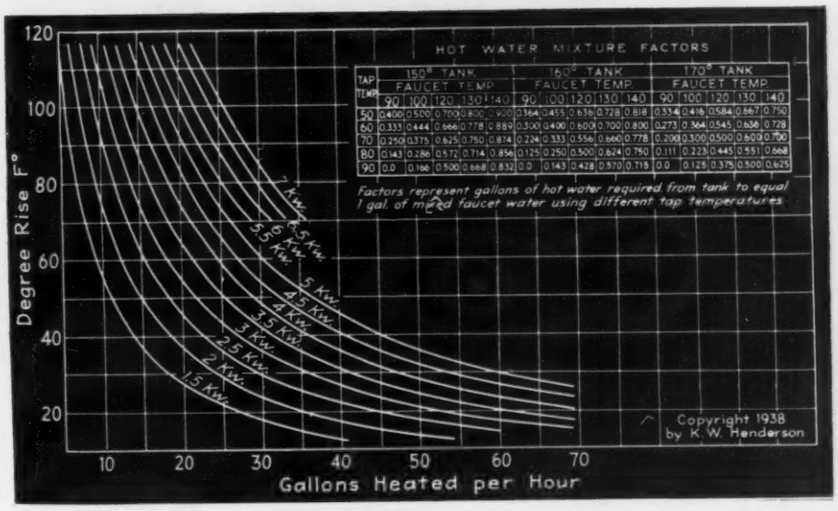
***Wattage and number of heating elements, tank sizes and demands of commercial customers developed from test method — Experience data of specific applications used for recommendations, high bill complaints, standardization***

**K. W. HENDERSON,** ***Manager Commercial Dept., Tennessee Electric Power Co., Chattanooga, Tenn.***

THE growing importance of commercial loads to utility companies has led to intensive promotion of this business. New lighting, air conditioning, cooking and water heating applications have been sold as dependable and ample aids to the commercial business and as such the customer has placed a high value upon these services. Therefore application problems of the commercial customer require more of an engineering approach than, for example, those of the residential customer, and particularly is this true when it comes to water heating installations.

In order to provide a more advanced basis for our own recommendations to commercial customers, we developed a series of preliminary curves and a test method which have led to more satisfactory installations and improved customer relations.

Information was needed to determine how much hot water should be drawn from the tank, which when mixed with cold tap temperature water would produce one gallon of water at a predetermined temperature. To supply this need it was thought the hot water curves and factor table shown in Fig. 1 would solve the problem.




| TAP TEMP | 150° TANK FAUCET TEMP 90 | 100 | 120 | 130 | 140 | 160° TANK FAUCET TEMP 90 | 100 | 120 | 130 | 140 | 170° TANK FAUCET TEMP 90 | 100 | 120 | 130 | 140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 0.400 | 0.500 | 0.700 | 0.800 | 0.900 | 0.364 | 0.455 | 0.636 | 0.728 | 0.818 | 0.334 | 0.416 | 0.584 | 0.667 | 0.750 |
| 60 | 0.333 | 0.444 | 0.666 | 0.778 | 0.889 | 0.300 | 0.400 | 0.600 | 0.700 | 0.800 | 0.273 | 0.364 | 0.545 | 0.636 | 0.728 |
| 70 | 0.250 | 0.375 | 0.625 | 0.750 | 0.874 | 0.224 | 0.333 | 0.556 | 0.660 | 0.778 | 0.200 | 0.300 | 0.500 | 0.600 | 0.700 |
| 80 | 0.143 | 0.286 | 0.572 | 0.714 | 0.856 | 0.125 | 0.250 | 0.500 | 0.624 | 0.750 | 0.111 | 0.223 | 0.445 | 0.551 | 0.668 |
| 90 | 0.0 | 0.166 | 0.500 | 0.668 | 0.832 | 0.0 | 0.143 | 0.428 | 0.570 | 0.715 | 0.0 | 0.125 | 0.375 | 0.500 | 0.625 |

**Fig. 1—Commercial water heating tool**
Chart shows relationship between heating unit capacity and water delivery for various mixtures of hot and cold water at three thermostatic settings

### *Use of Curves*

For the application of the curves and factors, suppose 20 gal. of 120 deg. faucet water is required per hour, the tank to be 150 deg. supplied by 50 deg. tap water. How much tank water will be drawn and what size unit and tank should be specified? The factor for 120 deg. faucet, 150 deg. tank and 50 deg. tap is 0.7, or for every gallon of 120 deg. water drawn 0.7 of a gallon comes from the hot water tank. With 20 gal. drawn at the faucet there would be required 14 gal. from the storage tank. The curves show that to heat 14 gal. per hour from 50 to 150 deg. (100 deg. rise) requires approximately 4 kw. If the difference between the initial and final temperature was 80 deg., then the same 4-kw. unit would heat about 19 gal. per hour. For a condition where 70 deg. tap prevailed with 150 deg. tank then the 120 deg. mixing factor would be 0.625 and the 19 gal. heated will produce 19/0.625, or 30½ gal. of 120 deg. faucet water with the 80 deg. rise, compared to 20 gal. through a 100 deg. rise. With these assumed conditions and the limited data at hand one might decide that a 30-gal. tank with a 4-kw. unit would supply the 20-gal.-per-hour demand for hot water. Let us study the problem further.

The 20-gal.-per-hour draw was to illustrate the application of the curves and factors. A more practical problem will lead us nearer to the solution of the proper size tank and units, and perhaps cause a change of opinion on the 30-gal. choice of tank. The problem may also show that more than the curves are required to arrive at a correct solution. Suppose the demand was over a three-hour period with the first 20 gal. drawn during the last ten minutes of the first hour. The second 20 gal. in the first ten minutes of the second hour and twenty more at the beginning of the third hour. With this condition the first and second hour demands constitute a steady draw of 40 gal. in twenty minutes. Quite different from 20 gal. per hour. Using a mixing factor of 0.7, this would require 28 gal. of 150 deg. water from the tank, with only 50 minutes remaining of the third hour to heat another 14 gal. for the third-hour draw. Due to the mixing action caused by incoming water during the previous draws the remaining two gallons in the 30-gal. tank would not be 150 deg. Considering the increment recovery of the units the average tank

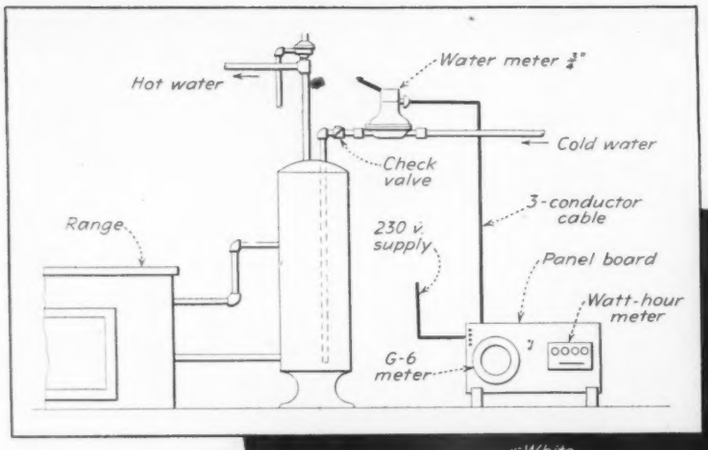



Fig. 2—Arrangement of apparatus to measure usage of water prior to electric installation

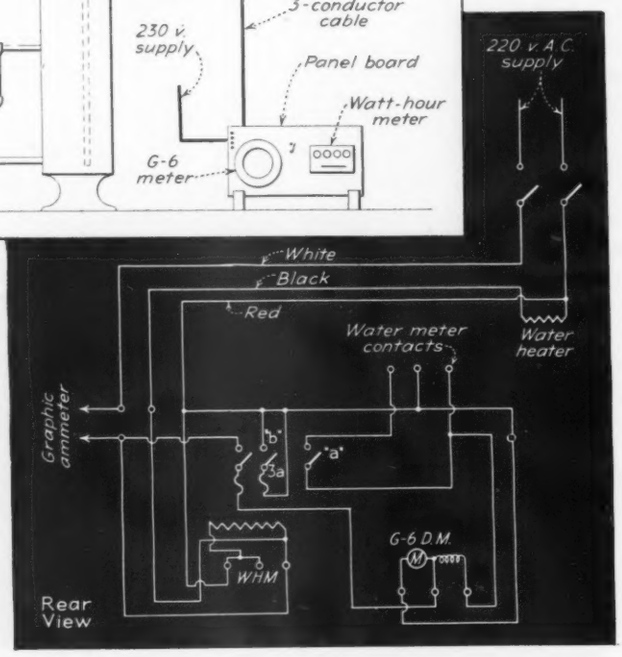



Fig. 3—Panel wiring for water heater test board

temperature might be assumed to be 90 deg., therefore to heat the third 14 gal. to 150 deg. in the remaining 50 minutes would require $\frac{14 \times 60}{50}$ or a rate of 17 gal. heated per hour. The curves show that this would require a 4-kw. unit. To insure delivery of this hot water to the line this unit would have to be near the top of the tank. To this connected load would be added another unit in the bottom to meet the conditions of other draws.

### *Need for Hourly Data*

The total gallons drawn per one hour, or the total for a fraction of that hour, might be a question that many commercial engineers feel they can answer with data obtained from past installations. In this early stage of commercial electric water heating it is doubtful if a sufficient number of installations have been made to serve as a criterion for accurate recommendation on future problems. The variation of usage in identical installations has manifested the need for individual study.

To make this possible we inaugurated the use of a simple metering and recording test panel. The test method confirmed our belief in the need for this hourly data. We find that no two commercial dishwashers used the same amount of water, although they were of the same size, serving a restaurant issuing nearly the same number of meals and other equal conditions. Like the barber shop using hot water for steam towels, the use varied with the idiosyncrasy of the user. In beauty parlor applications young women having a heavy, oily mass of hair required three or more rinsings for shampoos, particularly when the beauty parlors were located in mill areas. Our study further revealed that in metropolitan areas, where appointments for beauty treatments are necessary, less water per shampoo is used than in suburban shops. This might be explained by the fact that in suburban locations more leisure prevails, therefore more time and water are devoted to the task. Our test panel method used in more than fifty installations has revealed some interesting angles to the problem of correct application.

### *Test Panel*

The use and installation of this test panel is comparatively simple and inexpensive. Its use can be extended beyond the test field. It will be found invaluable for analysis of high bill complaints in either commercial or domestic sales.

The plan of installation is shown in Figs. 2 and 3, as applied to an existing hot water system using a range as the source of heat. A ¾-in. standard cold water meter is installed in the supply line at a point near the tank, with a check valve located at the exit side of the meter. This valve is necessary as a precaution against damage to the meter caused by hot water backing up in the line. The panel board equipped with suitable supports can be located on the floor or on a box. On its front side is the recording hourly demand meter and a watt-hour meter for measuring current consumption when tests are made on electric heaters. The block provides taps for connecting leads to a graphic ammeter. This is used in conjunction with the other instruments when a graphic cycle record of the hours the heating units were on is to be compared with the water drawn and recorded on the demand meter.

### *Demand Meter*

For this we used a type G-6, fifteen-minute, sixteen-day, 220-volt, motor-driven demand meter and changed it to one hour intervals, seven-day, by installing the following parts obtained from the General Electric Company:

1—Cat. 292171 Chart drive assembly.
1—Cat. 292176 Worm with set screws (R H D).
1—Cat. 292183 Worm with set screws (L H D).
1—Cat. 292188 and int. shaft assembly.
1—Cat. 292169 Front plates with bushings.
1—Cat. 1781314 Small gear with 1st int. shaft and hub.

The pen or stylus was shifted so that it would scribe its arc line from the outer to the inner circle of the chart. It is only necessary to shift the pen to accomplish this.

To complete the test panel a 15-amp., 220-volt, two-wire, type 1–14, single-phase watt-hour meter is used for measuring the kilowatt-hours consumed by the electric water heater. The wiring diagram shows connecting terminals for the use of a graphic ammeter.

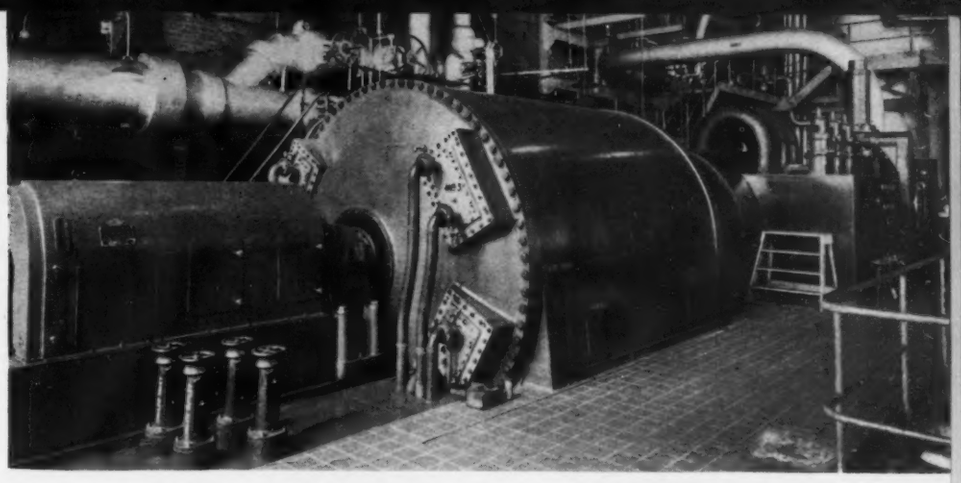
Two knife switches are required, one single pole, single throw for opening one contact circuit in the type D 13 contacts on the front of the panel, and on the rear, a double-pole single-throw switch for clearing the control circuit, should it be necessary to check on contacts, etc., while the board is energized. The

[*Continued on page 102*]

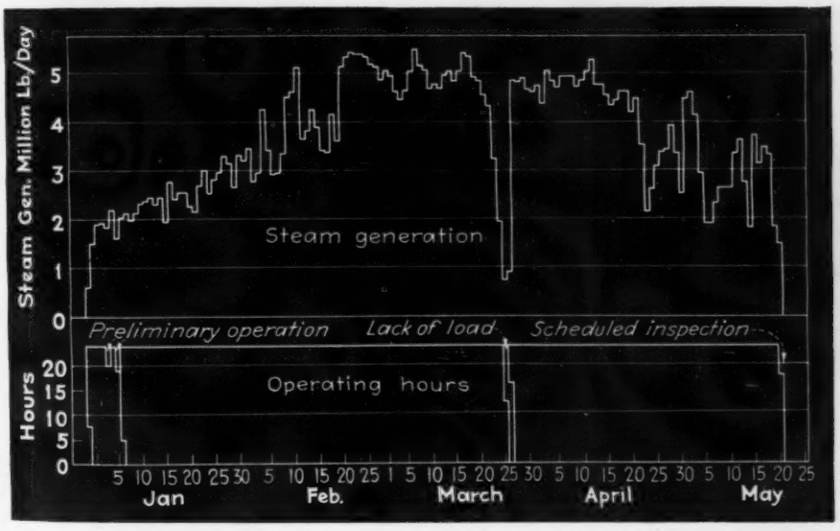
# New Capacity in Milwaukee

THE Wisconsin Electric Power Company recently placed in operation a new 13,700-kw. turbo-generator at East Wells Street station. The unit operates at 3,600 r.p.m., is hydrogen cooled and has a geared 1,500-r.p.m. exciter. It exhausts normally to the central heating system at about 20 lb. gage.

The turbine is bled at two points for feedwater heating in closed heaters. Another heat exchanger can be used as a condenser, thereby permitting full load to be carried on the turbine at any time, irrespective of heating demand. The electrical capacity of the generator is thus made firm for at least nine months of the year and is ready for use in emergencies in the summer. Steam is generated at 600 lb. and 825 deg. F. in the 225,000-lb.-per-hour boiler.



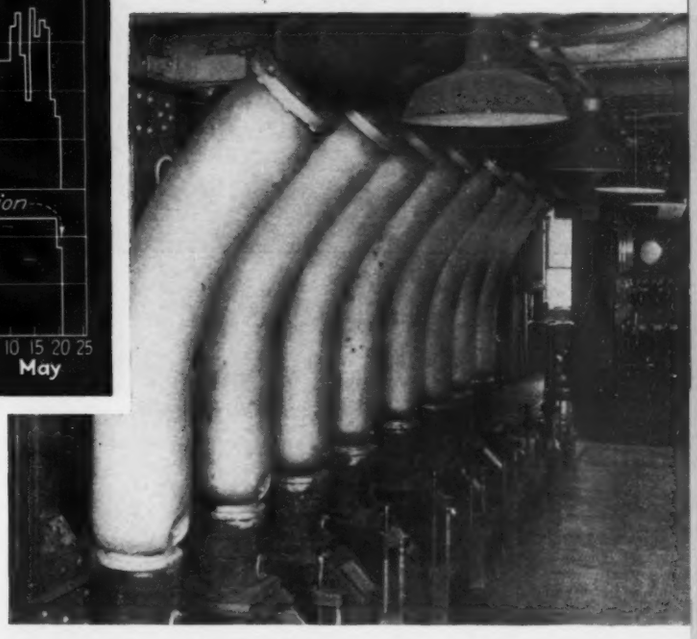
**Hydrogen-cooled, 3,600-r.p.m., 13,700-kw. generator normally exhausts to central heating system**

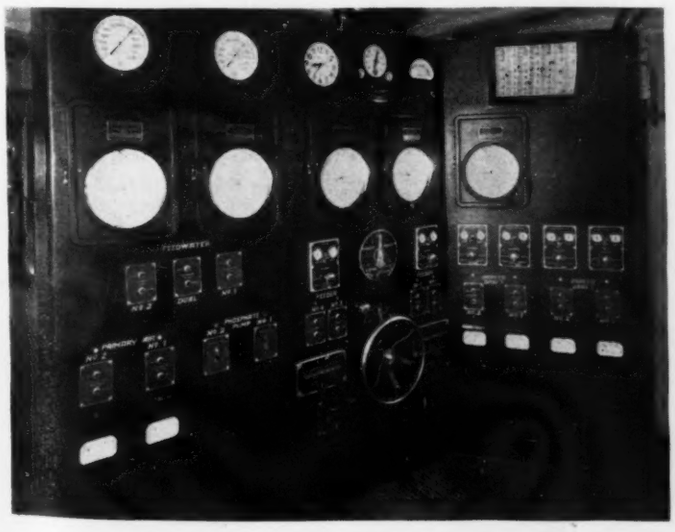



**Boiler on sustained duty**

Gradual increase in steam generator assignment applied during tune-up period in January. For the next three months output averaged more than 4,000,000 lb. per day except for lack of system load late in March.

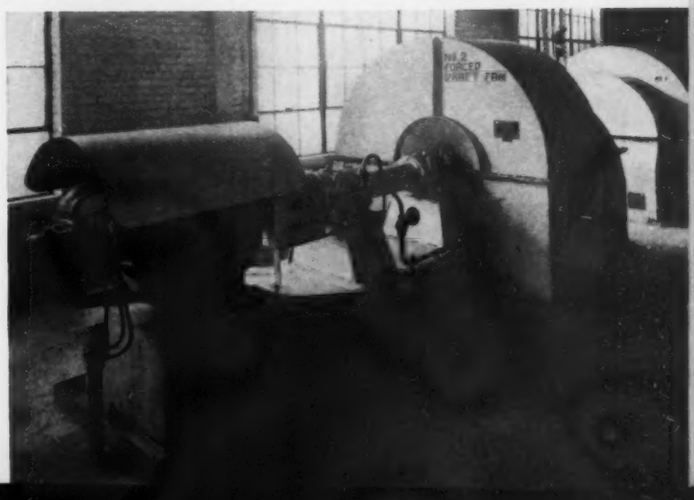
**Vertical firing of pulverized fuel through eight burners into a furnace of large volume assures low temperatures that permit continuous operation without danger from slagging.**





**Control panels for three-drum, bent-tube boiler with water-cooled dry bottom furnace fired with pulverized fuel from a storage system**

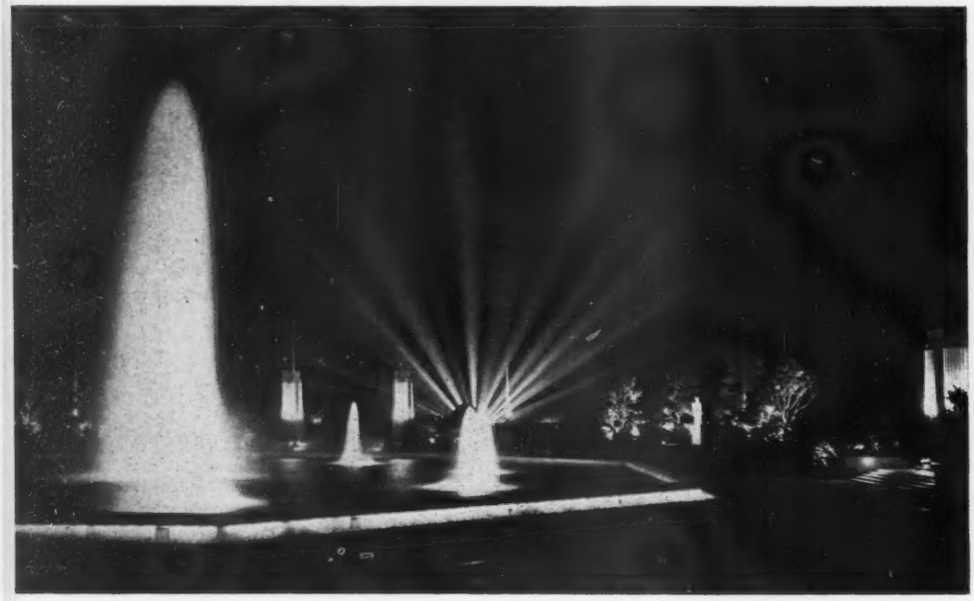
**Forced draft fans at rear of boiler room push air over plate type air heaters to raise the temperature to 600 deg. F. before admission to the furnace. Flue gases are lowered to 340 deg. F. before leaving the air heater**



# Dividends From Fair Lighting

***The man who created the lighting at Treasure Island describes it briefly and outlines its functions as a part of the Exposition and its possible effect upon future trends in decorative lighting***

**A. D. DICKERSON,** *Manager Illuminating Laboratory, General Electric Company, Schenectady, N. Y.*



**Sky lighting.**
The Aurora Borealis in the background is formed by 24 36-in. arc searchlights. At times these are manipulated in evolutions of color and motion by soldiers from the U. S. 30th Infantry. The fountain with white jets is curbed in green. Entrance pylons and statuary are lighted with white and trees with green mercury and incandescent floods. More than 300 amber "Happy Lanterns" hang from the trees surrounding the sunken gardens.

**Relief stands out.**
This 144x58-ft. vari-colored sculptured mural by the Bruton sisters above the Northwest Passage to the Court of Pacifica is lighted by clear and amber floods from a trough at its base. Sixteen 86-ft. lighting tubes each containing 10,000 watts of clear and amber lamps give a warm glow to this court.

AT NIGHT the Golden Gate International Exposition, on Treasure Island in San Francisco Bay, may be likened to a huge electrical showcase. Here the products of the lighting industry, particularly the new products, are on display, giving a better appreciation of the value of decorative lighting. Therein lies a bright future, an expanding market.

This article will not attempt to explain the many problems involved or the various methods adopted in the decorative lighting of the exposition. The decorative lighting of any exposition, its buildings, courts and architectural features, is more of an art than a science. Approaching his problem with tolerance toward the views of others, the lighting engineer endeavors to capture and intensify the spirit of the architect's conception. A spirit of compromise must prevail and strictly engineering considerations are subordinated in many cases to those of æsthetics. Considerable non-uniformity exists in the actual placing of the light sources to obtain desired effects, and inefficiency from a strictly engineering viewpoint is quite apparent. Visual and emotional satisfaction is the objective—not foot-candles.

### *The Practical Aspect*

Rather, this article will discuss briefly the decorative lighting on Treasure Island, its effect upon the general public and the future of the art and a few of the new lighting tools available for such illumination.

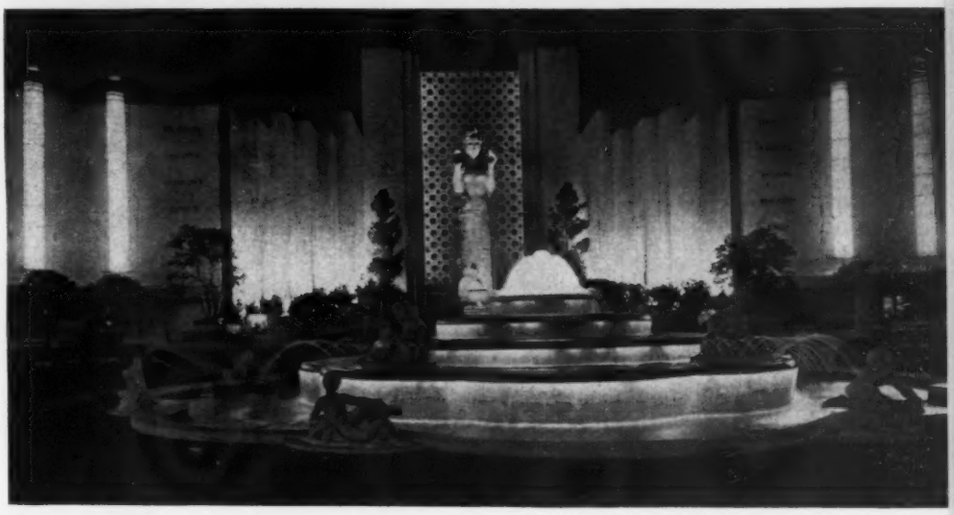
Colors have been used extensively to break the flatness which otherwise would be apparent on the flood-lighted façades. These colors emanate from various windows, entrances and decorative standards. Within the white walls the night picture changes to one of color, highlights, shadows, silhouettes, artistic

and mysterious lighting effects in a succession of courts.

The transition from one court to another is gradual yet distinct, with a harmony of both color and intensity of illumination so as to fit the visitor psychologically to the change in setting. An attempt has been made to take advantage of every flag, niche or unusual architectural element to introduce a change of color, or highlight, thereby increasing the liveliness of the night scenes and maintaining the observer's interest.

To the architect, engineer, artist, horticulturist, sculptor, and others, the night scene on Treasure Island serves to demonstrate that light as a medium for exterior decoration offers opportunities limited only by the ingenuity and artistic skill of the designer. Color and action, highlights and shadows—these are shown to create fascinating spectacles or to display architectural forms in their most attractive and fascinating manner. Light is demonstrated as a versatile tool to the professional man.

**Light adds perspective**
Louvered downlights from the crowsnests of the symbolic ships' masts light the floor of the Court of Seven Seas. The rhythmic repetition of the spot-lighted ships' prows surmounting the pylons accentuates the 1,000-ft. length of this court. Sculptured scenes of the sea in the niches of these pylons are painted with fluorescent paint and become glowing many-colored pictures under the influence of ultra-violet lighting at night. The facades of the court are flooded in an apricot green obtained from a mixture of green and pink fluorescent and amber incandescent floods.



**All the resources of light**
Ralph Stackpole's 85-ft. statue of Pacifica, with stainless steel prayer screen and background of softly fading colored lights, Thyratron-controlled colored fountain, green lighted cascades, 86-ft. lighting tubes and mercury-lighted trees.

### *Modern Ideas*

For the electrical industry the illumination of Treasure Island serves as a display of the most modern types of light sources, adapted to special architectural requirements. It is well to remember that these same sources could be used by the decorative lighting designer to serve other settings created by the architect. For the most part, these light sources are hidden from view, with the exception of strictly utilitarian roadway lighting and such decorative units as the 86-ft. cylindrical lanterns in the Court of Pacifica, the 53-ft. Siamese umbrella lighting units in the Court of Reflections, and similar equipment which serves for both lighting and architectural embellishment. In all, more than 10,000 fluorescent and incandescent floodlights, 1,000 special decorative units and 700 street-lighting luminaires are used.

Of particular interest to the electrical industry is the use of three new light sources to supplement the incandescent lamp. Each has its distinct field of application. Foremost among these new light sources is the fluorescent lamp. With the aid of its varied and colorful light it has been possible for the first time to mix lights as the artist mixes paints, producing theatrical results on large areas at reasonable cost.

More than 2,500 fluorescent floodlights are used in various color combinations for the illumination of building walls, setbacks, courts and to supplement incandescent floodlights in the illumination of other architectural features. For example, in the Court of Reflections the coral walls are lighted by pink fluorescent floodlights. In the Court of the Moon blue and pink fluorescent floodlights are mixed with incandescent floodlights having assymmetric blue lenses, producing a blue orchid-tinted illumination. In the Court of the Seven Seas the lighting of the walls demonstrates the adaptability of the fluorescent floodlight for creating such tints. A green apricot hue is produced by mixing amber incandescent floodlights with green and pink fluorescent units. Gold fluorescent floodlights illuminate the castellated setback wall above the main wall.

The fluorescent floodlights used on Treasure Island are trough-shaped and glass-inclosed, with double parabolic Alzak-processed reflecting surfaces which give fan-shaped beams of very high utilization efficiency. They employ 15-watt fluorescent lamps, 18 in. long, 1 in. diameter.

The commercial floodlighting of buildings, signs and poster boards by fluorescent floodlights opens a new commercial field. However, for the present, applications should be re-

[*Continued on page 107*]

# Public Relations Begin at Home

PUBLIC RELATIONS SERIES

***Forums help young employees see opportunities—Musical, sport and recreational activities vital part of program which knits company into one loyal, enthusiastic family***

**E. H. ADAMS,** ***Vice-President and Comptroller***
***British Columbia Electric Power & Gas Company, Ltd., Vancouver, B C.***

NEVER BEFORE was there a time when the cultivation of good will was more important than today. We must approach this problem by seriously asking the question, "What can we do to make people want to do business with us?"

Public relations is not management's problem alone—it concerns the board of directors and those responsible for financial and other policies. Above all, it starts at home—with our own employees. The public utility must establish a bond of understanding. Enthusiasm and loyalty never can be taken for granted. They must be developed, and developed by a natural process—not by artificial methods.

In our own British Columbia Electric Power & Gas organization we have some 3,500 employees and we have developed many mediums of strengthening the bonds of friendship between them and the management. All have proved unusually successful, we believe.

One of the most outstanding is the Junior Forum, which was organized last year. This has as its objective the education of the younger employees. It provides a medium whereby they

**E. H. Adams** *Steffins-Colmer Studio*

can secure a fairly detailed insight into the operation of all departments of the company, and it thus enables them really to understand why certain policies must be followed. Thus they can properly defend the company when it is unfairly criticised.

To the lad with vision, forum experience is an insight into opportunities for advancement. He realizes that, while he may now be filling a minor post, he is not a mere cog in the wheel, but an essential, even if small, part of a vast organization which presents untold opportunities for those who really want to succeed.

The forum idea was started one year ago and the age then confined to employees between 20 and 25. This was because demand for inclusion in the plan was heavy. The group was confined to a selected fifty. It was planned to carry on for one year only, but the young men this year decided they wanted to continue, so the forum is again operating with the same membership, while a second group of fifty has been formed for employees 25 to 30 years old.

Both groups, as a general rule, meet after office hours, save when it is necessary to see a department or plant in actual operation. The policy is thoroughly to cover one department at a time. At the first meeting a department or plant is visited, then at the next meeting the head of the department gives a lecture on what was seen during the visit.

When a department has been completed a questionnaire is distributed. This bears questions concerning

**British Columbia Electric employees turn out en masse for a holiday at Newcastle Island**

points on which the company desires employees to be particularly well posted, either to help them in their work or to enable them to meet criticisms of an unfair character. If the members do not know the answers they are at liberty to turn to department heads, or anyone they like, to secure the correct information. Along with these examination papers is a blank sheet, and on this members are encouraged to submit questions on any aspect of the department.

A dinner is held at the close of each departmental session, at which heads of the department visited are guests and answer the questions which members have submitted. A fee of 50 cents per month includes the cost of these dinners, which are held about every six or seven weeks. Meetings or visits take place weekly.

### *Self-Governing*

Members elect their own officers at the start of each departmental session and conduct their own meetings. This gives them a general knowledge of business procedure for public meetings and permits all to share in the forum work. Frequent changing of posts helps all members in learning to speak before an audience. An advisory committee is appointed by the management, but stays in the background as much as possible.

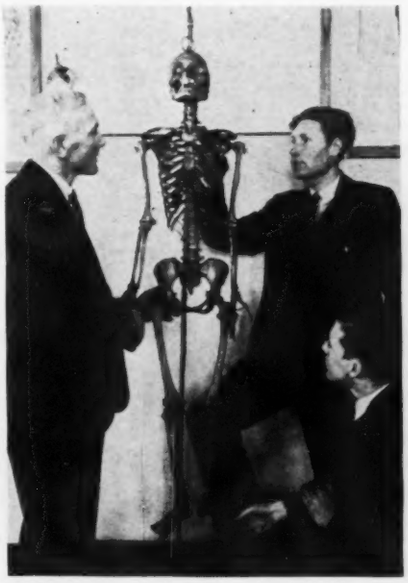
Department heads have responded so well to the idea that although it was at first intended to devote a couple of weeks to each department, the time for each has been greatly extended. During the period since the plan was commenced the gas, transportation, electrical generating and operating and the general sales department, including billing and accounting, have been covered. The time devoted to the plan by department heads is proof of their recognition of its value, while the long waiting list of those seeking admission proves its attractiveness to employees.

This organization is but one of many which is operated for office employees. Others include the public speaking class for men and women, which has met each winter for the past seven years, and in which interest has annually increased. The president's and vice-president's trophies are annually at public competitions. Then there is the male voice choir, which draws members from every department of the company. A creditable dramatic society, a brass band operated by gas department employees (which, incidentally, has won many honors in contests of high calibre) and a creditable motormen's and conductor's uniformed trumpet band are centers of interest to others.

**Flower show staged annually by the company's group of garden enthusiasts attracts 25,000 visitors each year to company's show room**

An Amateur Gardener's Association, whose members are mostly of modest means, stage a flower show of their own which attracts 25,000 people every year to the company's main appliance showroom.

Other developments include a gymnasium and other recreational equipment in a large men's building at the car barns for the transportation staff and the operation of a social and athletic clubhouse immediately adjoining the head office building. There is also a non-contributory pension scheme, a non-contributory death benefit scheme and a plan whereby employees can secure loans for building, or buying, their own homes. In cases of sickness or distress cash advances are made to relieve financial worries.



**Employees study anatomy in first-aid classes**

### *Employment Advantages*

In addition to all these points the policy of the company is to pay wages in every department which are generally higher than in most other businesses, taking into account the regularity and permanence of employment. Free transportation on the street railway system is provided, and every employee who is the sole support of his family pays only a nominal fee for lighting and reduced rates for gas. For these reasons the staff turnover is comparatively small and opportunities to enter the service of the company are sought after. The first aid teams, athletic clubs of various natures and the big annual picnics are among other employee activities encouraged by the management.

The point that must be emphasized in this outline is that in every phase of employee activity there must be some executive interest to lend encouragement to the idea. In this way an *esprit de corps* is developed.

Public utility companies spend much in advertising to create good will. It is not enough. It must be backed by time and effort spent in paving the way for spontaneous employee enthusiasm.

We can make people want to do business with us by surrounding ourselves with a staff of carefully selected, competent people, whose loyalty has been obtained by realizing the existence of human interest and whose efficiency has been developed by the presentation of the plain facts about our business.

# Editorials

S. B. WILLIAMS, *Editor*

## The Pace Setter for Appliance Sales

CAN dealer co-ordination be carried on successfully and the utility still be actively engaged in appliance merchandising? There are more than two sides to this question. There are the "yeses" and the "noes," as well as several shades of "in-betweens."

When anti-utility merchandising legislation efforts were at their peak one of the bones of contention was the method of compensation of salesmen. Where commissions were paid it was contended that salesmen used unfair methods to get the customer away from the dealer.

Today there is a greater degree of dealer co-operation than ever before, and still the commission form of payment is the one mostly used. According to a survey that ELECTRICAL WORLD has just made, summaries of which will be published in an early issue, seven out of ten utilities pay commissions.

This means then that in the past ten years or so the utility has found ways of co-operating with dealers and helping them to get the lion's share of the appliance business without sacrificing its position as leader and pace setter.

Dealer co-operation does not mean spoon feeding or paternalism. A lot of that does exist, but it isn't necessary, and in fact it probably weakens the dealer to the point where he will make little or no effort.

Appliances have not yet reached the point where they can be sold without considerable promotion and sales pressure. The dealer is willing to supply a demand, not create it. Somebody must do the job and set the pace, and that is the utility, simply because it must have a constantly rising residential use of kilowatt-hours.

The utilities need all the residential load they can get—it pays the net. This load requires larger and larger appliance sales. It is not a job that the utilities can or want to do alone. Therefore, just so long as this load is needed there will be active dealer co-ordination, but at all times and in all places the utility company will set the pace for the kind and quantity of appliance sales.

## The 3 per Cent Tax Classification Problem

WHAT is an industrial customer and what a commercial? It seems a simple question, but it has the federal revenue collectors as well as the utilities perplexed. The energy tax is not assessed against kilowatt-hours for industrial use, but in attempting to segregate the industrial customer there are a great many instances where the line is not clear cut.

For instance, when is a laundry a retail establishment and when an industrial? If a textile manufacturer has a retail store not separately metered, is the entire load commercial? Is a farm with a heavy pumping load or a large farm using many motors in the same category as a farm using energy only for residential purposes? Does size, the amount paid per kilowatt-hour or the rate schedule have any bearing on determination of classification?

When industrial load was exempted from the tax it was clearly recognized as a recognition of the competitive angle. A 3 per cent tax on certain loads would lose them to utilities in competition with customer-owned generation. This principle is still recognized by the revenue collectors, but the difficulty lies in setting up a method of classification fair to the government and fair to the utilities.

While the amount involved in the disputed cases is not a large part of the total tax on kilowatt-hour sales, the utilities have no inclination to pay more than they need to. Neither are they seeking to evade the payment of a fair and proper tax under the law. Nor has there been any complaint that the federal people are trying to enforce the collection of more than properly belongs to them.

The utilities are attempting, through the E.E.I., to arrive at an answer to this question that will be mutually acceptable. Whatever the answer is, however, it cannot be exact nor fit all cases unless the utilities are willing to agree to pay on all energy sales of whatever classification. The solution must be in the nature of an expedient covering the great majority of cases in an acceptable manner.

## Accident Record for 1938

OUT of thirty industries, electric utilities last year stood fifteenth in frequency rate of injuries and twenty-fifth in severity rate. The report of the National Safety Council for 1938 gave electric utilities a frequency rate of 11.42 and a severity rate of 2.76.

Unnecessary exposure to danger was the greatest contributor to fatalities and permanent partial disabilities. This cause is probably perennial, but back of it lies the extent of training and of supervision and degree of insistence upon use of safety devices.

There has been a fine improvement in the record

since 1926, but when the depression was at its worst the improvement ceased and when new construction picked up accidents went up also. The curve for the past thirteen years is most eloquent evidence of what happens the moment there is any let-up in a company safety program.

Good times or bad, there must be everlasting training and supervision if accidents are to be kept down. The men know that the hazards exist, but they grow careless—even the best of them.

## Mr. Davidson Is Needlessly Agitated

IN A recent broadcast urging the development of 4,000,000 hp. on the St. Lawrence and Niagara rivers, Maurice P. Davidson, trustee of the New York State Power Authority, viewed with alarm the power situation in the state, saying, "We are rich, but starving for lack of vision and enterprise."

If this electric power starvation exists or is imminent, it ought to be statistically demonstrable. Evidences should be apparent or be easily adduced to show that present power facilities are inadequate or will soon become so, that the utilities have been laggard in keeping up with the power demand and that danger really threatens the state because of delay in developing the "tremendous amount of horsepower at its back door."

Information on the power situation is indeed readily available and undoubtedly it would soothe the agitation in Mr. Davidson's mind if he could be induced to look at it. But probably no power on earth could induce him to do so, because he knows that if he did he would have nothing to get excited about. And how the politician does love to get all excited and worked up!

The supplement to the ELECTRICAL WORLD of May 6, 1939, presents capacity data as of the end of 1938 for eight major utility systems in the state of New York. The total, 4,808,938 kw., accounts for 98 per cent of the aggregate capacity of privately owned utilities as reported by the Federal Power Commission for the same year.

The supplement also records the peaks on generating equipment. The sum for the eight systems is 3,006,025 kw. That leaves a clear margin of some 1,800,000 kw. The true margin is, in fact, somewhat larger, since the peaks are, very probably, non-coincident.

So long as there is an excess of 60 per cent in the front yard it seems premature, to put it mildly, to worry about the non-use of what is in the back yard.

Development of needed power facilities is, of course, essential to our economic welfare, although in the case of water power the competitive cost of other energy sources must be considered. But developments that are not needed constitute an economic waste that is to be condemned, whether the burden falls on the taxpayer or on private capital. Neither government nor private enterprise can supply power for less than what power costs. Always the cost must be paid.

## Encourage Writing

AN INCIDENT of a few days ago is so typical of a situation which arises every now and then that we want to recite it and make some observations. A young but experienced engineer was asked why he didn't write for electrical publications. And the answer was that he had tried to on different occasions, but wasn't able to get permission from his superiors. At times he had written articles for them to sign, but he had never been able to get into print under his own name.

Where this situation exists it is seldom the result of a company policy, but rather does it stem from some individual who as a department head feels that any credit for meritorious ideas from within his bailiwick should go to him. We can see times when such a point of view is not without justification. On the other hand, the harm that can come from such a restrictive policy is so great as to warrant the setting up by management of a policy that will actively encourage authorship.

Employees understand why manuscript must receive approval before it can be released. If the article does not correctly reflect the company's practice, obviously it should not be printed. And even if correctly stated, there may be a policy situation that would make its publication unwise.

When a young engineer prepares a manuscript for a publication, be he ever so modest, he is talking with pride of accomplishment. And the fact that it is printed stimulates his initiative, increases his self-confidence and encourages him to do other things that stand out.

The writing of articles does another thing: It helps men to organize their thinking and thus brings out qualities that otherwise might never be recognized. A survey would probably show that most of the leaders in association committee work are men who have been frequent contributors to technical literature.

It would be silly even to imply that just by writing a man would automatically become a leader. No amount of writing will give him qualities which he does not possess. But if by writing he can disclose capabilities not recognized beyond his own department his company will have benefited. For part and parcel with an attitude on the part of a department head to discourage writing by those under him there frequently goes the fear complex that if the men under him are built up they may displace him or he may lose them to some other department.

This is not a plea on the part of the technical press for more contributors, for the problem today is to choose from the wealth of available good material. Rather is it a plea to management to encourage and bring out the best in the best of young men. The technical press has been an important factor in the sound engineering development of the utility industry through the interchange of constructive ideas and practices. What is less known is that it has been an important factor in bringing to light men who have later become leaders.

Let no department head nor any one else have the power to hide talent.

# Some Adjournment Observations

By CARTER FIELD

*This noted journalist gives his personal comments and interpretations on current happenings affecting the electrical industry. His background and his location at Washington make his thoughts informative and interesting even though all may not agree with him*

REMEMBER the old chestnut about the traveling salesman called upon to "itemize" his expense account?

How he put down $6 for meals, $5 for a hotel room, $3 for taxis and $95 for "incidentals"?

Everything changes but human nature. Take a look at the recent TVA itemized account of how it arrives at the flood protection value to the Mississippi Valley because of Gilbertsville Dam.

In the formal report submitted to the President and by him sent to Congress Gilbertsville Dam is alleged to give $200,000,000 worth of protection to the Mississippi. TVA figures "total" protection of the Mississippi Valley from Cairo (where water from the Tennessee, via the Ohio, enters the big stream) down at $381,378,000. This means, of course, the value in addition to the various forms of protection in existence prior to Gilbertsville.

Apparently $200,000,000 being a good round sum is the reason for fixing this as the share of additional protection Gilbertsville Dam would furnish. But the three-eighty-one-odd millions are carefully itemized, just like the traveling salesman's expense account, as follows:

| | |
|---|---|
| Cities | $6,700,000 |
| Railroads | 10,550,000 |
| Highways | 1,500,000 |
| Unprotected marginal areas | 6,182,000 |
| Backwater areas | 32,240,000 |
| Floodway areas | 11,304,000 |
| Reduced levee maintenance | 5,290,000 |
| Reduced seepage damage | 7,612,000 |
| Protected agricultural area | 300,000,000 |

Don't you love the globularity of that last figure, $300,000,000, after such a breaking away from round figures in the "marginal areas" and the "reduced seepage" items? Well, the report says this is the estimated increase in the value of the land if complete, as against "barely complete," flood protection were provided.

Capital is proverbially timid, and FDR is recognized as being very resourceful, but there is really enough evidence now to predict that the Congressional worm has turned on this loan and grant subsidy idea to government ownership electric projects.

A glance at the record:

House of Representatives cut the TVA bond issue from $100,000,000 to $65,000,000, Senate finally agreeing—*but* it took all George Norris' stubbornness on the conference committee to kill restrictive amendments which would have curtailed TVA's operations.

Senate adopted an amendment to the spend-lend bill which would have barred the use of any of the money for projects to compete with private industry in communities where there was adequate service. This died, along with the spend-lend bill, but it shows the temper and how it has changed. Moreover, this did not just slip through; it was formally voted after a bitter attack from Norris and others that it was hamstringing the march of public ownership.

### *"No Competition" Trend*

House of Representatives adopted a no-competition-with-private-industry amendment to the $125,000,000 PWA appropriation in the relief bill. This "no competition" clause is in the law, though of course the PWA appropriation was killed, and hence it is meaningless so far as this measure is concerned. However, this again shows the temper.

Then there is the question of taxes. One of the little unfair items about competition between public ownership projects and those privately owned has been that the privately owned corporation was taxed almost to the breaking point, whereas the publicly owned unit escaped. This is by way of being rectified, not in the sense that there will ever be really fair treatment as between the two as competitors, but at least the rough edges will be shaved. Even more important, in the consideration of this problem, in Washington, in state capitals and in county courthouses, this formerly concealed weapon of the government ownership enterprises is being exposed to the glare of the taxhunter's searchlight.

For example, the Norris bill, introduced toward the end of the session which ended August 5, did not pass. But the only reason it did not pass, if one is to judge by conversations with the legislators, is that there just wasn't time to get anything through. Congress wanted to go home. Little doubt exists that it will pass at the next session.

### *The TVA Tax Basis*

At present TVA pays 5 per cent of its gross revenue—in those states—to Alabama and Tennessee. Under the new proposal it would distribute an amount starting at 10 per cent and running down to 5 per cent in ten years. It is provided that the contribution to any state cannot be less than the ad valorem taxes previously paid by the private owners, plus the taxes paid by the owners of lands inundated for power purposes. (No allowance is made for lands submerged for flood control or navigation, which of course, being the lower lands, would be the more valuable.)

But the probability that this bill will pass next session is not cited as part of the change of heart already discussed on the part of Congress. The thing is even more heartening because it springs from the power that controls congressmen—even as against a forceful President. It comes from the folks back home who are having tax troubles due to the sharp curtailment of the tax base by public ownership projects.

Not the voice of the individual taxpayer. Seldom is much attention paid to that. But from the state and local office holders, threatened with near-extinction. And it should be remembered that these state and local office holders are not only important cogs in the political machines, but political leaders, for the most part, in their own right.

When they shriek the bigwigs at Washington listen. Even Norris can hear them.

# NEWS OF THE WEEK

## Tennessee Utility Ready to Transfer Properties

***Municipalities will take over electric system at midnight on August 15 — Electric revenue bonds to finance purchase sold to bankers — Congress to consider tax bills at next session***

Preparations for the physical transfer at midnight August 15 of the electric properties of Tennessee Electric Power Co., subsidiary of Commonwealth & Southern, to the Tennessee Valley Authority and municipalities in the area moved rapidly ahead this week as the cities completed the sale of bonds to finance the purchase.

As the actual date of transfer neared, the cities began to weigh possible profits against tax losses. To meet the rising opposition to the tax loss, Senator Norris and Representative Sparkman (Dem., Ala.) left for the next Congress the consideration of bills which would tax the gross power revenues of the TVA in order to compensate states for tax losses resulting from the government's power project.

### *Jobs of Employees*

Prime consideration of the employees of the private utility was the question of security of their jobs. President Wendell L. Willkie of Commonwealth & Southern obtained from TVA the promise to retain employees, other than a few of the tops. However, developments of the past few days indicate that there is cause for uneasiness among a large number of employees.

As far as TVA is concerned, President Roosevelt has signed the bill giving it $61,500,000 to finance its share of the $78,600,000 purchase of the Tennessee utility's properties. A total of $46,000,000 was set aside for TVA's share of the purchase.

Preferred-stock holders of Tennessee Electric Power on August 11, the deadline set for liquidation and dissolution of the company, received $100 and accrued interest. The company had approximately $24,000,000 in preferred stocks outstanding.

The Federal Power Commission has approved proposed credit contracts whereby the TVA will assist some of the municipalities and co-operatives to purchase their share of the Tennessee Electric Power facilities. The commission has also authorized the sale of the private utility properties under the contract of May 12, as extended and modified by the contract of July 19. A charge of 3½ per cent interest on the advanced credits would be charged.

### *Purchases System*

The city of Etowah has purchased the Etowah Water & Light Co. for $375,000 to distribute TVA power.

Harriman City Council voted to purchase at $251,900 the distribution system in Harriman, South Harriman, Emory Gap, Webster and Oakdale.

The town of Somerville has agreed to purchase the distribution system of the Interstate Utilities Co., serving the towns of Moscow, Rossville, Macon, Oakland and Williston, at a price of $18,500.

As the tax loss situation was being discussed Governor Cooper of Tennessee indicated that the state would mark time in its search for a utility tax replacement program pending the next session of Congress.

The Norris bill divides the tax payment into two parts—payments on the generating and transmission properties acquired by TVA and payments on the distribution systems bought by the municipalities and co-operatives. The latter question is regarded as being a matter between the states and the municipalities, and it is intended that the states make such arrangements as they wish.

### *TVA to Pay 10%*

Under the present arrangment TVA pays Tennessee and Alabama 5 per cent of gross revenue; the Norris bill would substitute a 10 per cent payment decreasing over ten years to 5 per cent. The contention is that TVA's increasing revenues would result in a substantially constant payment to the states.

The percentage of TVA's gross revenue to be paid would be allocated among the states, half in proportion to sales within the state and half in proportion to value of power properties located there. The payment to any state could not be less than the ad valorem taxes paid by the former private owners of power properties and of inundated lands in reservoir areas allocated to power.

So that TVA may not have to make payments to a multitude of local governing bodies, the bill would provide that the full payments be made to the states, and that the states would allocate part of the money to the counties concerned.

## Cities Sell Bonds

The following Tennessee cities have sold bonds to finance the purchase of electric facilities of Tennessee Electric Power Co.:

NASHVILLE sold to Solomon Bros. & Hutzler $15,000,000 of electric power revenue bonds, due June 1, 1942 to 1959, at an interest cost basis to the city of 2.32 per cent. Reoffering of $3,170,000 of 3¼s and $11,830,000 of 2¼s was made at prices to yield 0.85 to 2.50 per cent.

COLUMBIA awarded to a syndicate headed by Cumberland Securities Corp., Nashville, an issue of $800,000 of electric revenue bonds at an interest cost basis of 2.804 per cent for 4s due 1942 to 1945 inclusive and 2¾s due 1946 through 1959.

MCMINNVILLE awarded to Blyth & Co.

**NIGHT BASEBALL—The first game at the Cleveland Municipal Stadium under the new G.E. lighting system drew 55,305 spectators, a new night record in the major leagues. Installed by the Osborn Engineering Co., the system has 712 floodlights of 1,500 watts. Robert J. Swackhamer, G.E. lighting expert, designed the system**

and Equitable Securities Co. an issue of $450,000 electric revenue bonds on a bid of 100.05 for $354,000 of 3s and $96,000 of 2¾s, at a net interest cost basis of 2.912 per cent.

CHATTANOOGA sold $13,200,000 of electric revenue bonds due 1941–68, to group headed by Smith, Barney & Co. at an interest cost of 2.7065 per cent; divided $12,510,000 of 2¾s and $690,000 of 2½s.

CLEVELAND sold $750,000 of electric revenue bonds, due 1942–59, to Blyth & Co. on a bid of 100.01 at net interest cost of 2.77 per cent; divided $99,000 of 3¼s and $651,000 of 2¾s.

PULASKI sold $120,000 of electric revenue bonds, due 1942–59, to Nashville Securities Corp. on a bid of 100.01 at net interest cost of 2.892 per cent; divided $39,000 of 2¾s and $81,000 of 3s.

MARYVILLE sold to Booker & Davidson $425,000 of electric revenue bonds due 1942–59, at an interest cost of 2.80 per cent.

ROCKWOOD sold to Equitable Securities Corp. $135,000 electric revenue bonds, due 1942–59, at an interest cost of 3.48 per cent.

HARRIMAN sold $276,000 of electric revenue bonds to John Nuveen & Co. and C. H. Little & Co. at a net interest cost of 3.19 per cent.

MOUNT PLEASANT awarded an issue of $265,000 electric revenue bonds to John Nuveen & Co. and associates on a bid of 100.043 for $246,000 of 3¼s and $19,000 of 2¾s, due June 1, 1942 to 1959 inclusive, on an interest cost basis of 3.188 per cent.

LA FOLLETTE sold $500,000 electric system revenue bonds due June 1, 1942 to 1959, to John Nuveen & Co. and associates at 100.001 for $92,000 of 3¼s and $408,000 of 3¾s, at a net interest cost of 3.62 per cent.

CLINTON awarded $340,000 electric revenue bonds due June 1, 1942 to 1959, to Stranahan, Harris & Co. and associates at 100.01 for $183,000 of 3¼s and $157,000 of 3s, equal to a net interest cost of 3.09 per cent.

LOUDON sold $105,000 electric system revenue bonds due June 1, 1942 to 1959, to Booker & Davidson and associates at par for $13,000 of 3s and $92,000 of 3¼s, at a net interest cost of 3.24 per cent.

LEXINGTON sold $150,000 electric revenue bonds due June 1, 1942 to 1959, to John Nuveen & Co. and associates at 100.67 for $128,000 of 3-1/3s and $22,000 of 3s, at interest cost of 3.39 per cent.

SHELBYVILLE sold $350,000 revenue bonds, due 1942–59, at 100 to Stranahan, Harris & Co. and associates, $324,000 of 3s and $26,000 of 2¾s, at net interest cost of 2.97 per cent.

SWEETWATER sold $95,000 revenue bonds to John Nuveen & Co. and associates at net interest cost of 3.33 per cent.

WINCHESTER sold $165,000 revenue bonds, due 1942–59, to Thomas H. Temple and R. S. Dickson at 100.082, at net interest cost of 3.19 per cent; $141,000 of 3¼s and $24,000 of 3s.

MURFREESBORO sold $590,000 electric revenue bonds, 1942–59, to Nashville Securities Corp. and associates at 100.035, at net interest cost of 2.819 per cent; $256,000 of 3s and $334,000 of 2¾s.

LENOIR CITY sold $272,000 revenue bonds to Stranahan, Harris & Co. and associates at net interest cost basis of 3.325 per cent.

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## Plan Plant Expansion

The 1940 budget of Richmond, Ind., will receive only $200,000 from anticipated earnings of the municipal light plant, instead of $316,000 which the general fund has received the last three years from this source. The cut was decided on in order that funds be available for plant expansion. The proposed budget for the utility for next year will be $404,500 for operating expenses and $422,200 for construction.

## Application for REA Note Granted by SEC

Application by the New York State Electric & Gas Corp. for exemption from the Holding Company Act of a sale of a $325,000 note at 2.73 per cent to the Rural Electrification Administration and a pledge of $425,000 of first mortgage bonds as collateral for the note has been approved by the SEC. The funds will be used to finance 276 miles of rural electric line extensions for service to approximately 1,070 customers. A similar application of nearly identical amount by the same company for an REA project was approved recently by the SEC.

Central Power & Light Co. has filed an application for an exemption from the requirement for filing a declaration in connection with the proposed issue and sale of $25,000,000 first mortgage bonds, series A, due August 1, 1969, and $7,000,000 serial debentures or notes. Net proceeds from the sale of the securities, together with other funds of the company to the extent required, will be used for the redemption at 104 of $32,045,200 of 5 per cent first mortgage gold bonds, due August 1, 1956.

SEC has announced that Leonard S. Florsheim, trustee Inland Power & Light Corp., debtor, has filed an application for approval of the sale of $243,500 principal amount of 5 per cent first mortgage gold bonds, due April 1, 1947, of Michigan Public Service Co.

Copper District Power Co. has filed a declaration in connection with the issue and sale of $78,750 unsecured 4½ per cent notes, due August 11, 1940.

SEC has issued an order exempting the Litchfield Electric Light & Power Co. from the provisions of Section 6-A of the Public Utility Holding Company Act with respect to the issue and sale of $450,000 of first mortgage bonds 4 per cent series due in 1964. Net proceeds will be used to settle an open-account debt to the parent company, the NY PA NJ Utilities Co.

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## Condemnation Action

Public Utility District No. 1 of Watcom County has been authorized by United States District Judge John B. Bowe to proceed with its condemnation action against the Puget Sound Power & Light Co., under which the district seeks to force the utility to sell certain of its service facilities. Action follows a similar decision by Federal Judge E. E. Cushman in a hearing at Tacoma granting similar orders to the districts of Lewis and Cowlitz counties.

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## Ask Equipment Bids

The Public Utilities Commission of Manitowoc, Wis., care of W. C. Staeffler, will receive bids on August 24 on a 10,000-kw., 400-lb. W. S. P. 2,300/4,000-volt turbo-generator, surface condenser, air cooler, pumps and auxiliaries. Estimated cost is $300,000.

# Appliance Sales Drive Planned for the Fall

***Utilities, manufacturers and national associations to co-ordinate efforts in gigantic nationwide campaign — Sammis sees promotional program keeping dealers' cash registers busy***

A gigantic electric appliance sales campaign will get under way this fall with utilities and manufacturers participating. The drive will be backed by the Modern Kitchen Bureau, Better Light-Better Sight Bureau and national appliance associations.

"Here is a money-making opportunity for every one who sells electrical appliances for the kitchen," says Walter H. Sammis, vice-president of Commonwealth & Southern Corp. and chairman of the Modern Kitchen Bureau. Mr. Sammis said that the bureau is presenting five splendid promotional programs for use this fall which will keep the cash register busy for every dealer who takes part enthusiastically.

### *Promote Acceptance*

It was pointed out that the purpose of these programs is to develop and promote customer acceptance of the modern electric kitchen. After four successful years of promoting the modern electric kitchen it is found that the public is ready to buy once this acceptance has been cultivated.

The manufacturers are joining with the utilities and the national associations in promoting the sales of household appliances by demonstrating and illustrating the convenience of a modern home workshop. The drive will demonstrate the efficiency and convenience of modern electrical appliances and the advantages of their use.

Representing the co-ordinated activities of the manufacturers of electric ranges, water heaters, dishwashers, refrigerators, roasters and other equipment and utility companies throughout the country, the Modern Kitchen Bureau has done considerable effective promotional work. As Mr. Sammis says: "It serves to inspire similar co-ordinated activities by local representatives of dealers, utilities, manufacturers and distributors."

Mr. Sammis is one who practices what he preaches. This fall the companies in the Commonwealth & Southern system will put on an extensive appliance and load building campaign which, it is anticipated, will lift the average annual use of electricity of its domestic customers well above the present high figure of 1,200 kw.-hr.

As of the end of June, Mr. Sammis said that the average annual kilowatt-hour use was 1,115 for Consumers Power, 1,043 for Central Illinois Light, 1,127 for Ohio Edison, 1,491 for Tennessee Electric Power, 1,280 for Alabama Power, 1,421 for Georgia Power.

While the utilities are putting manpower in the field to increase their power load and business and the manufacturers are after more sales and production activities, the primary object is to expand the use of electricity in all homes and farms so that the people can have the full benefit and convenience of cheap electricity.

The remarkable work which the utilities have done in widening the use of electricity and maintaining adequate facilities to supply this service is indicative of the stability of the industry and the progressiveness of its management. The halt to government competition with the industry, through subsidized projects, has renewed investor confidence in the industry. This is being reflected in the splendid reception accorded utility issues which have come into the security markets.

**WORLD'S FAIR—Crowds at the New York World's Fair in the air-conditioned exhibit of Carrier Corp. viewing the Aurora Borealis projected on the 70-ft. dome**

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## Will Use $1,500,000 on Line Extensions

That $1,500,000 of new money from the recent $22,000,000 refunding loan made by the Washington Water Power Co. will be available for extension and expansion of the company's distribution system was announced recently by Kinsey M. Robinson, president, upon his return to Spokane from New York.

Mr. Robinson reported a more favorable outlook for co-operation between the federal government and the private utilities in the distribution of government power to be generated at Grand Coulee Dam and other federal projects at a saving to the consumer. He said he had tendered the services of his company to the government with this in view.

With an improvement in business and the extension of its lines the company hopes to be able to announce another rate reduction early next year. Recently rate reductions amounting to $250,000 were made. "Our company is pleased," Mr. Robinson said, "with the favorable reception our recent issue of bonds received from the bond buyers throughout the country. This bond issue was more favorably received than any similar issue in recent months."

At a recent press conference President Roosevelt said that there is no lack of investors' confidence in public utility bonds and to prove it cited this financing operation of the Washington Water Power Co. He identified the company only as one operating near Grand Coulee Dam and said it had no difficulty in finding purchasers of its securities.

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## Distributes Refunds

It is costing Florida Power & Light Co. about $175,000 to distribute $3,600,000 in electric bill refunds to 96,000 customers. The utility has an appliance sales drive under way.

## Utility Steam Service Expands in Northeast

The protracted drought in New England, which had become front page daily news at the close of last week, has resulted in a heavy utilization of steam-generating facilities by both public utility and industrial plants as hydro capacity has lessened along the principal watersheds. In many cases auxiliary generating units called into service mainly on peaks in the late fall have been put on the line.

Prominent power systems depending to a large extent on hydro under more favorable conditions have turned to their own auxiliary steam plants and to interconnected companies having large steam capacity to assist them in carrying daily loads, but no material shortage of utility power has been reported.

The companies provided with extensive storage reservoirs have been nursing these along in hopes of early and protracted rains. Several steam plants have been started up to supplement hydro, and municipal electric pumping has gone upon longer hour service in cases where gravity supplies required reinforcement.

While these conditions tend to increase operating costs materially on utility systems, the interconnections now effective in New England are proving extremely valuable, and for the present, certainly, the indications are that utility service will continue unimpaired in the various load centers even if the drought should continue for a number of weeks more.

Industrial loads are holding up well and an upward trend in manufacturing is reflected in many utility outputs, with domestic loads continuing widespread gains from the Canadian border to Long Island Sound.

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## FPC Denies Extension

The Federal Power Commission has denied the petition of Louisville Gas & Electric to set aside its order of June 16 denying further extension of time for submission of accounting entries in regard to original cost statements, and at the same time refused to consider any further extension of time for filing such data.

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## Green Mountain Dam Strike

An explosion cut off power to the strike-harassed Green Mountain Dam last Sunday while National Guardsmen patrolled the area to prevent further rioting following labor troubles. Work was resumed at the $4,000,000 project, a unit in the Colorado-Big Thompson reclamation and power development, after being halted since July 12 by a strike of five A. F. of L. unions seeking collective bargaining recognition. Seven persons were injured in shootings as a back-to-work group sought to push through picket lines.

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## Second Bonneville Line Plan Approved by Ickes

Secretary Ickes has approved plans for a second transmission line connecting Bonneville and Grand Coulee power plants by way of Tacoma and Seattle instead of paralleling the first circuit. The new 220,000-volt line will cost approximately $3,000,000.

A $7,000,000 allotment to United States army engineers to continue work on Bonneville power house for the next fiscal year has been received. During the 1939-40 fiscal year Bonneville will have $20,400,000 for its construction program.

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## Authorizes New Line

The Public Service Commission has authorized the Missouri Utilities Co. to construct a 33,000-volt electric transmission line from its generating station at Cape Girardeau to Charleston. The company said the new line, which parallels another, is required for providing adequate facilities to serve properly the cities of Charleston, East Prairie, Bertrand, Anniston and the territory east and west of Sikeston.

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## REA Co-op in Red

Caldwell County's REA-sponsored electric line, serving 954 customers, is still operating in the "red," and this despite a 75-cent amortization added recently to the bills, according to a report to the North Carolina Rural Electrification Authority by Superintendent G. F. Messick. The line was established against the advice of the state REA, which said that 2,500 customers were needed to make it profitable.

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## Authorizes Rural Lines

The Illinois State Commerce Commission has authorized six utility companies to construct 146 miles of rural electric line in 24 counties. The mileages approved included: Central Illinois Light, 12.5; Mount Carmel Public Utility & Service Co., 22.1; Central Illinois Public Service, 0.81; Illinois Iowa Power, 5.1; Illinois Northern Utilities, 88.25; Public Service Co. of Northern Illinois, 17.25.

## June Output 14% Above 1938 Month

Production of 10,352,132,000 kw.-hr. of energy for public use, as reported to the Federal Power Commission, made the output the third highest for any month on record, 14 per cent greater than in the like month of 1938 and exceeded only in December, 1938, and March, 1939. On an average daily basis it was the highest ever attained. Production by water power dropped to 36 per cent of the total, compared with 45 per cent in April and 41 per cent in May. In addition, production by electric railway, electric railroad and other plants which generate principally for their own use totaled 170,635,000 kw.-hr.

Production in the twelve-month period ended June 30 was the largest for any similar period thus far—120,536,000,000 kw.-hr. Output during the first six months was decidedly above that of previous years, the totals being 57,889,000,000 kw.-hr. in 1937, 54,199,000,000 kw.-hr. in 1938 and 60,538,000,000 kw.-hr. in 1939, the last-named being 11.7 per cent over 1938 and 4.6 over 1937, which was the previous maximum.

Reports were received during July indicating that the capacity of generating plants in service on June 30, 1939, totaled 39,600,000 kw. This is a net increase of 94,000 kw. over that previously reported in service on May 31, 1939. The figures refer to all classes of public utility plants, not merely those for electric light and power.

Coal stocks on hand on July 1 comprised 6,695,469 tons of bituminous, 0.7 per cent less than at the beginning of June, and 1,242,902 tons of anthracite, 3.6 per cent more than on June 1. Combined consumption during June amounted to 3,495,693 tons, against 3,235,590 tons in May.

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## Bids on New Power Plant

The City Council of Columbia City, Indiana, has authorized the Board of Public Works to proceed with preliminaries toward calling for bids for installation of a 2,500-kw. turbine at the municipal plant to cost about $120,000. Frank T. Schultz, superintendent, has recommended that a 625-kva. vertical Ames steam engine be installed also.

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## Work on Television

There will be no radical changes in the present system of television during the next year, in the opinion of Philo T. Farnsworth, vice-president of Farnsworth Television & Radio Corp.

## Niagara Falls Gets New Street System

The new controlled incandescent street-lighting system in the business district of the city of Niagara Falls, N. Y., is said to have made these streets a model of street-lighting efficiency. Mayor W. Levell Draper switched on the new system, which replaced a magnetite-arc system, which for many years was considered to be the finest in the country.

Buffalo Niagara Electric Corp. engineers and Adin W. Chase, city electrician, who co-operated on the survey which resulted in the new incandescent lighting, consider that the streets in the business area of the city are the best lighted in the world.

The new program of illumination covers 8.3 miles of main and secondary business streets and 15 miles of residential thoroughfares, all changed over from arc lamps to the controlled incandescents, which are focussed like an automobile headlight.

The former type lamps bathed the streets in approximately 15,000,000 lumens of light, as compared with the brilliance of 20,000,000 lumens cast by the new incandescents. The 1,023 6.6- and 4.4-amp. magnetite arcs were replaced by 6,000-, 10,000- and 15,000-lumen incandescents mounted 22½ feet. The city owns the poles and brackets and the utility owns the luminaires and circuits. The system is served by a single overhead conductor.

**STREET-LIGHTING SYSTEM—This new controlled incandescent street-lighting system in the business district of Niagara Falls replaces a magnetite-arc system and is said to make the streets a model of street lighting efficiency**

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## Operating Economies In Merger of Units

Unification of the four operating utilities composing the Western Massachusetts Companies group into a single property called the Western Massachusetts Electric Co. is now under consideration by the Massachusetts Department of Public Utilities.

The recent hearing before the board was marked by a cogent exposition of the benefits of centralized management since 1927, when some 11 properties in the middle Connecticut Valley were brought under the control of these interests with the primary object of maintaining local autonomy and ownership. The latest step contemplates setting up a single operating company to serve the Springfield-Greenfield-Pittsfield area.

W. Rodman Peabody, vice-president of Western Massachusetts Companies, stated that 122 rate reductions have been effected on the group system, and that if 1927 rates had continued, the users of power, domestic and commercial service would have paid $21,814,912 more in the period since than present rates require. Of these savings, $19,400,176 went to domestic and commercial customers. The public has had the benefit of an increase in taxation revenue from these properties rising from $15.60 per dollar of gross income in 1927 to $23.50 in 1938. Payrolls have risen from 20.3 to 24.2 per cent of gross revenue; but dividends have increased only from 21.9 to 22.2 per cent of gross income, for the Western Massachusetts Companies. Total assets of the system Dec. 31, 1938 were $49,868,874.

Although the four utilities in the operating group (United Electric Light, Turners Falls Power & Electric, Pittsfield Electric, and Western Massachusetts Electric) are now owned 100 per cent by the holding company (Western Massachusetts Companies), and are managed as an integrated organization, Mr. Peabody declared that it would be beneficial to legally consolidate them into one operating property. Savings will result in reports to governmental bodies, and also in bookkeeping.

The Turners Falls company now supplies electrical energy to Western Massachusetts Electric at seven points through 17 different meters. United has four points of supply from Turners Falls. Contractual situations will be greatly simplified by the merger. Plans are in mind for zoning rates in the territory, one set being for the populous Springfield area and the other for the balance.

It was also pointed out that with a single company system planning would be on a better long-range basis, notably in determining where to locate additional generating and transmission facilities. In rural electrification, President Harry E. Duren of the Western Massachusetts Electric Co., operating in the Greenfield region, testified to the board that in certain locations, consolidation of utilities simplifies the extension of lines and their financing in border districts. In the long run, the public gains from economies resulting from mergers of the type proposed.

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## Plan Bond Issue

The proposed flood control and power dam project on the Angelina and Neches rivers in Texas moved a step nearer realization when it was announced that the flood control districts in which improvements are to be made would issue bonds for its share of the project, which is to cost $28,000,000.

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## Ask Installation Bids

Arthur L. Nelson, engineers, Boston, will receive bids August 25 for installation of 10,000 ft. of 23-kv. cable and 75,000 ft. of 4- and 5-kv. cable already purchased by the Taunton municipal lighting department.

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## Gift to Newlyweds

The Prague Electricity Supply Co. is presenting to all summer newlyweds a wedding gift—three months' free current. During the summer months the consumption of electricity is low.

## Philadelphia Unit Seeks Midwinter A.I.E.E. Meet

Letters have been sent to a representative list of members of the A.I.E.E. by the Philadelphia section to ascertain opinion on the proposal to hold the midwinter convention in Philadelphia instead of New York. W. B. Morton, secretary, states that the opinion of A.I.E.E. members in various localities is sought before the proposition is presented to the national board of directors.

Mr. Morton said that the last convention in Philadelphia was in 1924 and there was an attendance of 1,738 members, "which has far exceeded all records before or since for midwinter conventions." He points out that there is a great variety of attractions in Philadelphia with many industrial plants of interest.

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## Short-Wave Stations

Equipment which will have the effect of doubling the carrier power of General Electric's short-wave stations W2XAD and W2XAF, as well as result in a more faithful reproduction of programs, is now in operation, according to C. H. Lang, manager of broadcasting.

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## Porcelain Enamel Meet

Plans for the fourth annual forum of the Porcelain Enamel Institute are nearing completion, according to Frank E. Hodek, Jr., of the General Porcelain Enameling & Manufacturing Co., chairman of the forum committee. The forum will be held October 18-20 at Ohio State University, Columbus.

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## Sets Exhibit Record

Consolidated Edison set two new records over last week-end at the New York World's Fair as capacity crowds brought to 3,400,000 the season's total attendance at its "City of Light" exhibit. More than 153,000 persons visited the exhibit on Saturday and Sunday, establishing a two-day record for the diorama city.

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## Meeting in October

The Railway Electric Supply Manufacturers Association will hold its exposition at the Hotel Sherman in Chicago on October 24–26 in connection with the meetings of the electrical section of the mechanical division of the Association of American Railroads. John McC. Price, secretary-treasurer, states that key electrical men of all the railroads in the United States and some of Canada will be present for the meetings.

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## Metal Mining Meet

Visitors to the Metal Mining Convention in Salt Lake City, August 28–31, will have the opportunity actually to operate Westinghouse shovel equipment, for on display will be complete four-yard electric shovel equipment.

# MEETINGS

**International Association of Electrical Inspectors**—Joint annual meeting northwestern and southwestern sections, Hotel Empire, San Francisco, Calif., August 14-18; western section, Hamilton, Ont., September 11-15; southern section, Asheville, N. C., September 18-22.

**Illuminating Engineering Society**—Annual meeting, Fairmont Hotel, San Francisco, Calif., August 21-25. Howard M. Sharp, general secretary, 51 Madison Avenue, New York, N. Y.

**National Association of Railroad and Utilities Commissioners** — Annual meeting, Seattle, Wash., August 22-25. Clyde S. Bailey, secretary, New Post Office Bldg., 12th and Pennsylvania Avenue, Washington, D. C.

**Maryland Utilities Association**—Annual fall convention, George Washington Hotel, Ocean City, Md., August 25-26. J. H. Purdy, secretary, Lexington Building, Baltimore, Md.

**Rocky Mountain Electrical League**—Annual convention, Estes Park, Colo., September 7-9. George E. Lewis, manager, Gas and Electric Bldg., Denver, Colo.

**Electrochemical Society** — Fall convention, Hotel Commodore, New York, N. Y., September 11-13. Dr. Colin G. Fink, secretary, Columbia University, New York, N. Y.

**Wisconsin Utilities Association**—Annual convention accounting section, Plankinton Hotel, Milwaukee, Wis., September 21-22; electric section, commercial and technical divisions, November 6-7, Schroeder Hotel, Milwaukee. A. F. Herwig, executive secretary, Room 502, Brumder Bldg., 135 West Wells St., Milwaukee, Wis.

**National Industrial Advertising Association**—National conference, Hotel New Yorker, New York, N. Y., September 20-22. William H. Easton, chairman, publicity committee, 420 Lexington Av., New York, N. Y.

**Association of Iron and Steel Engineers**—Annual convention and exposition, William Penn Hotel, Pittsburgh, Pa., September 26-29. Brent Wiley, managing director, Empire Bldg., Pittsburgh, Pa.

**American Institute of Electrical Engineers**—Great Lakes district, Minneapolis, Minn., September 27-29; Middle Eastern district, Scranton, Pa., October 11-13. H. H. Henline, national secretary, 33 West 39th St., New York, N. Y.

**Indiana Electric Association**—Annual convention, French Lick, Ind., September 28-30. Tom C. Polk, secretary, 607 Traction Terminal Bldg., Indianapolis, Ind.

**International Municipal Signal Association**—Annual meeting, Providence-Biltmore Hotel, Providence, R. I., October 9-12. Irvin Shulsinger, secretary, 7 East 42 St., New York, N. Y.

**National Electrical Contractors Association**—Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa., October 9-12. L. W. Davis, general manager, 420 Lexington Av., New York, N. Y.

**National Electrical Wholesalers Association**—Semi-annual convention, Hotel Gibson, Cincinnati, Ohio, October 16-20. E. Donald Tolles, managing director, 165 Broadway, New York, N. Y.

**National Safety Congress and Exposition**—Atlantic City, N. J., October 16-20.

**Empire State Gas & Electric Association**—Annual convention, Westchester Country Club, Westchester, N. Y., October 19-20. George H. Smith, secretary, Grand Central Terminal, New York, N. Y.

**National Electrical Manufacturers Association** — Annual meeting, Palmer House, Chicago, Ill., October 23-27. W. J. Donald, managing director, 155 East 44th St., New York, N. Y.

## Better Light Bureau Prepares New Plan Book

The National Better Light-Better Sight Bureau has sent to commercial vice-presidents and advertising and sales promotion managers its new plan book to assist in preparation of Better Light-Better Sight activities.

G. R. Trumbull, manager, states that several recent developments of note point to this fall and winter being one of the greatest concentrations on the activity.

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## I.E.S. Trademark Ruling

The right of the Illuminating Engineering Society to prevent the registration of the trademark "I.L.S." as conflicting with the well-known mark "I.E.S." of the society was sustained in a decision by Leslie Frazer, assistant commissioner of patents. The Seelig Specialties Co. of New Orleans attempted to register the mark "I.L.S." for portable electric lamps, such as so-called floor lamps, and the society filed an opposition proceeding to such registration.

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## Plan Thurston Celebration

The centennial of the birth of Robert Henry Thurston, pioneer in engineering education and the first president of the A.S.M.E., will be celebrated October 25 at Ithaca, N. Y., by Cornell University in cooperation with the A.S.M.E. Delegates from American and Canadian engineering schools, technical and academic societies in this country and abroad of which Dr. Thurston was a member, and other organizations, together with the alumni of Stevens Institute and Cornell University from the classes in Dr. Thurston's time, will be special guests.

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## FPC Holds Last Hearing

The Federal Power Commission held its last hearing July 28 and will not resume hearings until some time early in September. Commissioners Claude L. Draper and Leland Olds are staying in Washington studying testimony, but no hearings are to be held.

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## To Study Modern Methods

Modern methods of displaying and dramatizing industrial products will be studied at the New York World's Fair by members of the National Industrial Advertisers Association during their 1939 conference to be held at the Hotel New Yorker, New York, September 20–23.

## Output Continues Above Other Years

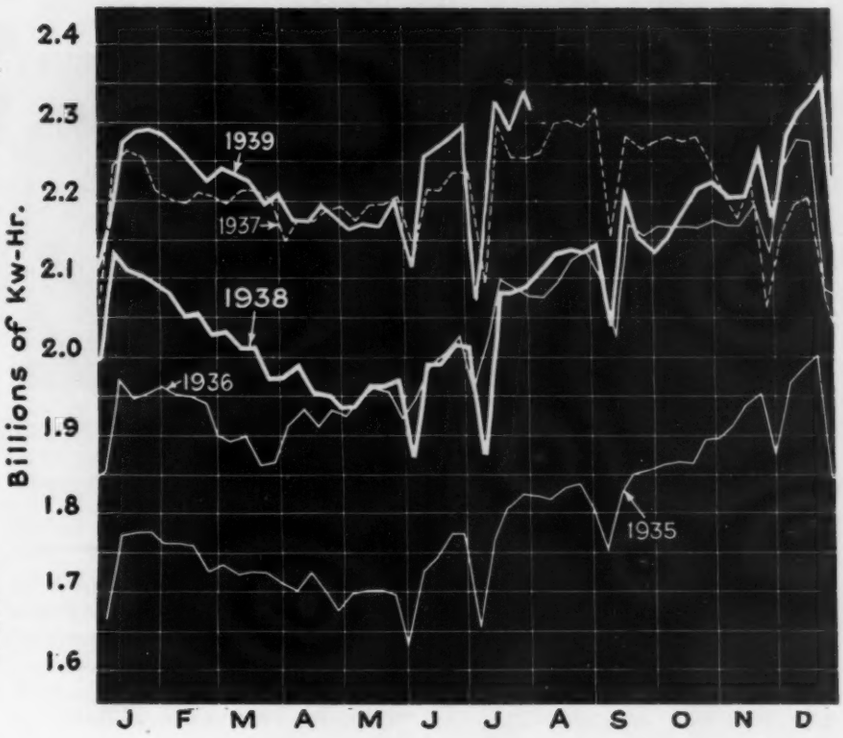
Slipping slightly from the all-time summer peak, but maintaining the lead over all other weeks this year, the output of energy by the electric light and power industry during the week ended August 5 amounted to 2,325,-085,000 kw.-hr., according to the Edison Electric Institute. The gain over the corresponding period of 1938 remains large, although it shrank moderately to 9.9 per cent, compared with an average of 11 per cent in July. The curve also continues well above that for 1937, the margin being 2.8 per cent, against an average of 1.6 per cent in July.

**Weekly Output, Millions Kw.-Hr.**

| 1939 | | 1938 | | 1937 | |
|---|---|---|---|---|---|
| Aug. 5 | 2,325 | Aug. 6 | 2,116 | Aug. 7 | 2,262 |
| July 29 | 2,342 | July 30 | 2,094 | July 31 | 2,256 |
| July 22 | 2,295 | July 23 | 2,085 | July 24 | 2,259 |
| July 15 | 2,324 | July 16 | 2,084 | July 17 | 2,298 |
| July 8 | 2,078 | July 9 | 1,881 | July 10 | 2,096 |
| July 1 | 2,300 | July 2 | 2,015 | July 3 | 2,238 |

**Per Cent Change from Previous Year**

| Region | Week Ending Aug. 5 | July 29 | July 22 |
|---|---|---|---|
| New England | +14.1 | +14.5 | + 9.2 |
| Middle Atlantic | + 8.7 | +10.6 | + 6.2 |
| Central Industrial | +12.1 | +13.7 | +13.1 |
| West Central | + 2.8 | + 3.3 | + 7.0 |
| Southern States | + 8.5 | +11.6 | + 9.9 |
| Rocky Mountain | + 9.8 | +16.9 | +15.2 |
| Pacific | + 7.3 | + 8.8 | + 7.1 |
| United States | + 9.9 | +11.8 | +10.1 |




In regional gains over 1938 the Rocky Mountain area has yielded first place to New England, where the excess continues to be more than 14 per cent. Despite disturbances in the automotive industry the Central Industrial section is second, with a gain of 12.1 per cent; the Mountain region is third, its gain having dropped to less than 10 per cent. As in the preceding week the smallest increase is reported for the West Central states.

## Power Users Exceed Phone Subscribers

Announcement by the Bureau of the Census of statistics of the telephone industry for 1937 affords opportunity for comparing two great utility industries in the electrical group.

Operating revenue was $1,180,028,-372, equal to 54.2 per cent of the revenue from ultimate consumers of electric light and power as reported by the Edison Electric Institute for the same year. Number of telephones, 19,424,200, amounted to 71.5 per cent of number of light and power customers. The $5,000,-456,000 investment in plant and equipment was 36.3 per cent of the corresponding figure, $13,800,000,000, as estimated by ELECTRICAL WORLD. The number of telephone employees, 325,-943 was larger, however, than those of the other utility by 18 per cent, and salaries and wages, $516,640,009, were 27.5 per cent greater, using ELECTRICAL WORLD'S estimate in both instances. The comparisons are subject to change when Census figures are announced for light and power.

Compared with 1927, electric light and power revenue from ultimate consumers increased 31 per cent. Gains for the same period in the telephone industry were, in per cent: Operating revenue 15.3, investment in plant and equipment 40.9, number of telephones 4.9, salaries and wages 6.2. Employees decreased 11.2 per cent. Miles of single wire increased 42.2 per cent to 90,-787,172.

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## Utility Merger Completed

Consolidation of the general offices and management of the Indiana Gas Utilities Co. of Terre Haute, Ind., with the Kentucky-Tennessee Light & Power Co., Bowling Green, Ky., has become effective. The general office for both companies will be located in Bowling Green.

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## Stock Sale Approved

Application of the Northern Indiana Public Service Co., Hammond, Ind., covering the sale of its holdings of 215,-280 shares of the common stock of Chicago District Electric Generating Corp. to the Commonwealth Edison Co., present owner of the remaining outstanding shares of the stock, has been approved by the SEC. The price will be $2,513,-735.

## Carrier Shows New Line for Home Air Conditioning

Marking its entry into the $5,000 home market, Carrier Corp. this week introduced a new line of home air conditioning and automatic heating equipment featuring a low-cost "Weathermaker" for homes in this price class at a series of sales and demonstration meetings throughout the United States.

Meetings were conducted by E. T. Murphy, vice-president in charge of marketing, and George Long, manager home air conditioning department.

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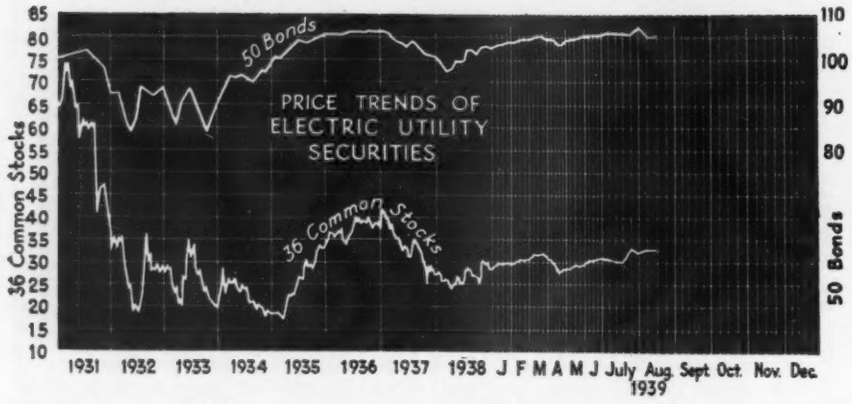
## Allowed to Buy Debentures

Utilities Power & Light Corp., Ltd., a Canadian corporation, has been authorized to use $3,000,000 of available cash to buy debentures of its debtor parent corporation at a price 70 per cent of the principal, Charles T. Adams, trustee, and R. R. Monroe, president, have announced. Debenture holders who accept the offer, it was explained, cease to participate in the estate of the debtor. The statement said there is outstanding an aggregate of $36,236,700 of debentures, including $28,674,700 held by Atlas Corporation.

## Advance of Utility Stocks Continues


50 Bonds
PRICE TRENDS OF ELECTRIC UTILITY SECURITIES
36 Common Stocks
36 Common Stocks
50 Bonds
1931 1932 1933 1934 1935 1936 1937 1938 J F M A M J July Aug. Sept Oct. Nov. Dec. 1939

**Electric power and light company stocks continued in their current upswing during the past week. With a gain of 0.5 point, the "Electrical World" index of common stocks stood at 33.1; index a year ago, 27.7. The bond index lowered 0.1 point to 105.9**

## Pennsylvania Utility Bonds Are Offered

Utility financing dominated the securities markets this week as a nation-wide group of underwriters, including 125 investment firms, offered a total of $123,500,000 of Pennsylvania Power & Light Co. securities. Public offering was made of $95,000,000 of first mortgage 3½ per cent bonds, due 1969, at 105½ and $28,500,000 of 4½s at 104. The utility has arranged with four New York and Chicago banks for a loan of $8,500,000.

The net proceeds will be used to redeem $102,000,000 of first 4½s; to acquire for cancellation from Lehigh Power Securities Corp. $19,000,000 of the company's first 4½s; to acquire by redemption from Lehigh Power Securities Corp. $10,000,000 of the company's 6 per cent debentures; the remainder of net proceeds, estimated at $892,500, to be used for additions, extensions, etc.

The financing is one of the largest operations of its kind in the history of the power industry. While the primary purpose of the financing is to reduce mortgage debt and annual interest charges, it will enable the dissolution of Lehigh Power Securities Corp., with Pennsylvania Power & Light becoming a direct subsidiary of National Power & Light, unit of Electric Bond & Share system.

Another offering of importance during the week was the $4,800,000 of Central Ohio Light & Power Co., consisting of $4,100,000 first mortgage 4s, due 1964; $500,000 of 3½s serial notes, due August 1, 1940–44, and 2,200 shares of $6 cumulative preferred stock. The bonds were priced at 103¼; the 3½ per cent notes at an average price of 101.02, and the stock at $90 a share.

The net proceeds, together with cash on hand, will be used to retire the company's outstanding 5 per cent bonds, the three-year 4½ per cent convertible secured notes, to pay off miscellaneous indebtedness, and to reimburse the treasury for $187,000 for capital expenditures.

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## Oklahoma Gas & Electric Files Refunding Program

Oklahoma Gas & Electric Co. has filed with the SEC a registration statement proposing an offering of $17,000,000 first B 3¾ per cent bonds due 1955, 58,000 shares of $5.50 convertible prior preferred stock and 290,000 shares of $15 per common stock. Stone & Webster and Blodgett, Inc., will be the principal underwriter. The company proposes also to borrow $8,000,000 from banks on unsecured serial notes when the new securities are sold.

Proceeds of the new issues will be used to redeem $16,814,000 first A 4s of 1951 at 105, $10,000,000 convertible 5 per cent debentures of 1946 at 110 and 22,000 shares of convertible 6 per cent $100 par prior preferred stock at 110.

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## Bridgeport Brass Sells $3,500,000 of Debentures

Bridgeport Brass Co. has notified the SEC of the sale of $3,500,000 serial debentures bearing interest rates ranging from 3 to 4¼ per cent maturing 1940-49. Of this issue $2,500,000 will be applied toward payment of an equal amount of outstanding notes which mature December 31, 1940. The balance will be used for working capital.

The New York Trust Co. subscribed for $1,250,000 of the new issue, the Aetna Life Insurance Co. $1,200,000 and the Travellers Insurance Co. $1,050,000.

## Niagara Hudson Unit Proposes Bond Issue

New York Power & Light Corp., subsidiary of Niagara Hudson Power Corp., contemplates the sale of such of its proposed new 3⅜ per cent refunding mortgage bonds as are not accepted by holders of its presently outstanding 4½s to a small group of insurance companies, according to Alfred H. Schoellkopf, chairman. In addition, Mr. Schoellkopf said, the company intends to sell to the insurance companies a sufficient amount of new 3½s, due 1964, to realize funds for retirement of $270,000 of Fort Henry Light, Heat & Power Co. 5s, due 1946, and $313,000 of Troy Gas Co. 5s, due 1939.

New York Power & Light is seeking authority to exchange $66,000,000 of new 3⅜s for a like amount of 4½s, due 1967, and $582,000 of 3½s to be sold privately to insurance companies. The proposed sale would save approximately $580,000 annually in interest charges and about $170,000 in excess cash.

Northern Indiana Public Service Co. has filed a registration statement with the SEC covering $45,000,000 first A 3¾s of 1969. Principal underwriter will be Halsey, Stuart & Co. The proceeds, plus a bank loan of not more than $6,000,000, will be used to redeem present outstanding bonds bearing a higher rate of interest.

•

## Declares Dividends

A dividend of $1 a share on the $6 and 6 per cent preferred stocks of Central Illinois Public Service Co. has been declared, payable September 15 to stock of record August 19.

•

## Approve Bond Plans

Shareholders of Public Service Co. of Indiana have ratified the proposed bond issue plan to refund the company's entire outstanding funded debt. The company has petitioned the state commission to issue $38,000,000 of 30-year, 3¾ per cent mortgage bonds and $10,000,000 of ten-year serial notes.

## Utility Reports

| | Net Income 1939 | 1938 |
|---|---|---|
| *American Lt. & Trac. & subs | $4,969,073 | $5,050,086 |
| *American Water Wks. & subs | 2,330,242 | 2,368,681 |
| *Connecticut Lt. & Pwr. | 3,744,404 | 3,574,435 |
| *Cons. Edison of N.Y. & subs. | 34,939,918 | 36,166,136 |
| *Cons. G.E.L.&P. (Balt.) & sub | 6,231,056 | 5,953,757 |
| *Continental G. & E. Corp. | 3,583,902 | 4,161,631 |
| *Eastern Util. Assoc. & subs. | 1,762,825 | 1,367,327 |
| *Electric Bond & Share | 9,699,954 | 10,113,865 |
| *Engineers Pub. Serv. & subs. | 4,795,566 | 3,648,898 |
| *Gulf States Util. | 2,211,185 | 2,091,920 |
| *Kansas City Pwr. & Lt. | 3,706,835 | 4,210,119 |
| *Louisville G. & E. (Ky.) & subs | 2,723,112 | 2,809,467 |

* Twelve months ended June 30.

# OPERATING PRACTICES

## Make-up Kept Low by Prompt Maintenance

By C. E. MILLER
Engineer Potomac Electric Power Company
Washington, D. C.

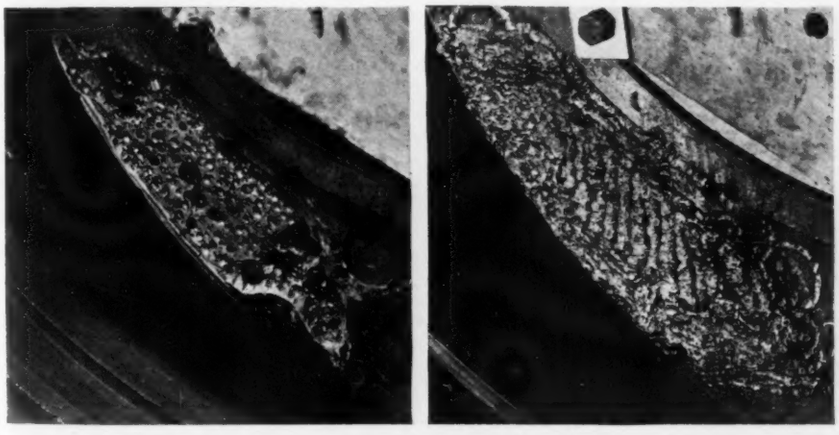
That the results of plans to reduce the make-up to a minimum have warranted the effort is well demonstrated when the records show that since the start of operation in 1933 the Buzzard Point make-up has averaged below 0.85 per cent. Of this value, approximately 0.50 per cent is steam used for blowing soot.

Of major importance in reducing losses is controlling steam leaks themselves. Safety, relief and drain valves are usually the major sources of loss from this source. Repairs undertaken immediately not only reduce steam loss but also prevent cutting flange faces, valve seats and disks and so prevent other more costly repairs.

All condensate gland seal water and gland leakage from boiler feed pumps, condensate pumps and heater drain pumps is returned to the system by way of the clean water sump pump. Turbine gland seal water, overflow from atmosphere exhaust, drains from exhaust steam lines are also all returned to the clean sump drains. Finally, it is considered the duty on the part of each operator, if he cannot repair the cause of steam or water leakage himself, to report the defect immediately to the maintenance department. This repair is then made as soon as operating conditions permit.

• • •

## "Skin Grafting" on Face of Turbine Casting



At the left is shown a case of "smallpox" that broke out on the casting of a 2,500-kw. steam turbine at the Rocky Ford plant of the Kansas Power & Light Company, Manhattan, Kan., recently. The "disease" showed up at first as a small fracture in the casting. The area around the crack was investigated by removing a thin surface, after which the structure appeared as shown. The "doctor," an arc welding operator, applied "new skin" (in the form of weld metal) over the affected area, making it appear as in the right-hand picture. The work was done by studding the outside of the casting and welding the 18½ in. long area with Lincoln "Ferroweld" electrode. The depth welded was from ½ to 1¾ in. After the "grafting" was finished the "patient" went back to work, the "operation" a complete success.

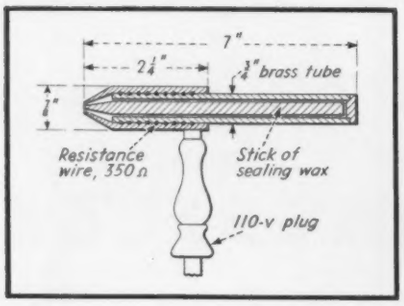
## Outfit Cleans Switch Contacts

This is a plating outfit used for cleaning (nitric acid bath, water, muriatic acid bath, water, coppering and replating) and renovating contacts for high-tension switches, an operation which saves a great deal of money in one of the small but important ways. It is in the service building of the Buffalo Niagara Electric Corporation in Buffalo.

•

## Inexpensive Tools for Sealing Instruments

For quick, clean and easy sealing of instruments, testers at the meter shop of the Central Illinois Public Service Company, Springfield, have developed the inexpensive, electrically heated sealing tool illustrated. The tool is of brass tubing and is 7 in. long. It holds a regular size stick of sealing wax that is heated at its lower end by a length of resistance wire wound around the outside of and insulated from the brass tube holding the wax stick. A second brass




**Sealing wax melter**

sleeve machined to a point fits over the heating element and delivers the molten wax to the point of application through a small hole at the point of the tool. About a minute is required for the tool to heat up. The resistance of the heating element is about 350 ohms and it operates on 115 volts.

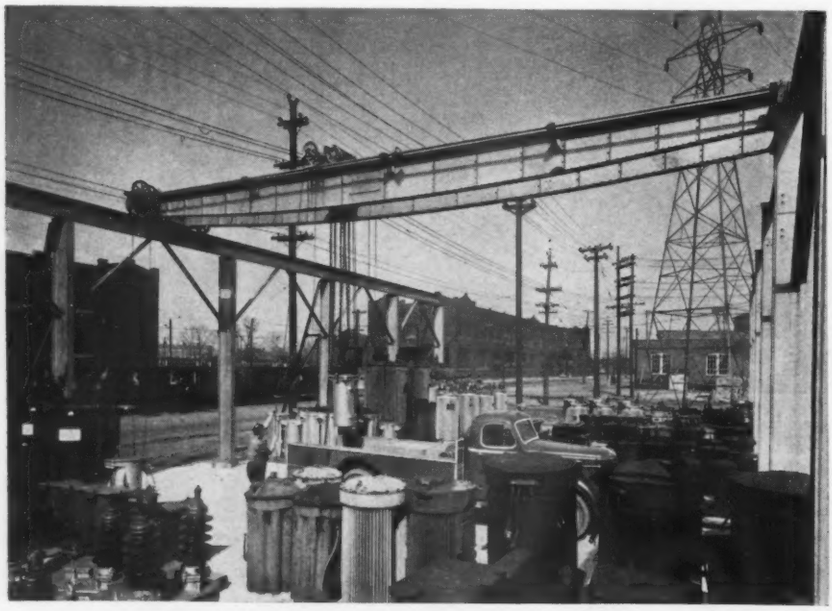
•

## Salvaged Plant Crane Handles Stored Stocks

Ingenuity, an abandoned interurban railway bridge, a crane salvaged from a small power house and available electric arc welding equipment, properly combined, yielded the heavy apparatus storage facilities shown, for the Indiana Service Corporation, Fort Wayne.

Heavy apparatus such as transformers, oil circuit breakers, and the like, were formerly kept at various locations in yards and buildings and generally handled by means of jacks, timbers, rollers, etc. A handsome return on investment in these handling and storage facilities is realized even on the basis of all new equipment.

The hoist has a capacity of 10 tons and will lift to a height of approximately 20 ft. above grade. The storage area of 45x90 ft. can be filled compactly by equipment, except for the drive-in space, due to the fact that equipment can be lifted over the top of the other units in the storage area.



**Heavy equipment storage facilities assembled from salvaged parts**

## Fault Locator Mounted on Auto Trailer

A Lundin fault locator used by the Narragansett Electric Company at Providence has lately been mounted on a trailer to speed up its handling to and from field jobs. The set is completely assembled on the trailer at all times and includes two transformers for 2,300 volts down, step-up arrangements for the required test voltage, and altogether with the trailer weighs about 1,200 lbs. The trailer couples to any motor car or truck bumper and is provided with a jumper for tail-light service. The arrangement saves time formerly requiring the handling of some 500 lb. of loose equipment by two men and provides swift service in case of trouble on the system. In the illustration the set has just been brought into Roger Williams Park, Providence, to locate the exact position of an underground secondary circuit installed long since to supply energy to a group of buildings now to be served by a new primary underground line following the same general route as the older line.

## The Type "U" Tester in the Shop

**By M. E. WILLIS and E. L. SCHLOTTERE**
Philadelphia Electric Company

The Doble type "U" tester has been found to be valuable in the shop testing of bushings, instrument transformers, lightning arresters, wood members and miscellaneous equipment. It is an a.c., 60-cycle instrument for testing the condition of insulation by measurements of watts loss and charging current at a given applied voltage. From these measurements the power factor may be calculated.

The "U" tester will operate with a source of supply between 85 and 120 volts and with a frequency of 50–60 cycles; if the system is ungrounded, a capacitance ground may be used to operate the test equipment. A heater circuit is provided to keep the condensers dry and thus reduce the surface leakage to a minimum.

### *Method of Testing*

Tests on completed bushings are made with the high-voltage lead connected to the conductor and the low-voltage lead to the support flange, which is insulated from ground by a sheet of fibre. Bushing cores are tested by placing the core upright with the end of the stud held by a special wooden test platform. The high-voltage cable is connected to the

## Tractor Compressor Gets to Rocky Places

Where conditions make it impossible to move an ordinary portable compressor over the right-of-way, the Avon River Power Company, Halifax, Nova Scotia, uses a Caterpillar Thirty with a Davey 160-cu.ft. air-cooled compressor for pole-line construction on inaccessible ground.

ground sleeve and the low-voltage lead to the conductor tube.

Tests on transformers either as complete units or windings only are made by placing them on a sheet of fibre and then connecting the high-voltage cable to the two high-side leads and the low-voltage cable to the two low-side transformer leads and core iron or transformer case.

Tests on wood members are made by placing clamps on each end of the wood and then attaching the respective test leads.

Lightning arresters are tested by placing them on an insulated platform and hooking the low-voltage lead to the bottom and the high-voltage cable to the top connection, as in actual operation.

The problem of testing a bare bushing core and getting comparable readings with a built-up core was solved in the following manner:

1. Paint an aluminum static shield on the paper insulation, identical in length and position to the shield on the built-up core.

2. Corona end bells are made of 3-in. asbestos tape rolled to standard dimensions over aluminum paint at the end of the static shield.

This test is used to evaluate the main paper insulation, where the cambric and/or the static shield has been damaged or destroyed.

Lightning arrester tests are made at voltages from 500 to 2,400 volts by means of a special 2.4-kv. potential transformer permanently mounted on the case of the "U" tester.

The conclusions from the present test experience with the "U" tester are:

1. Work, both in the field and shop, has been economically expedited and congestion materially reduced.

2. Close control and follow up of insulation condition has been maintained.

3. Valuable information on new methods and materials has been obtained.

4. Field tests are checked under ideal conditions of temperature and weather.

5. The type "U" tester is versatile and can be used for practically any insulation test within the limits of its design.

•

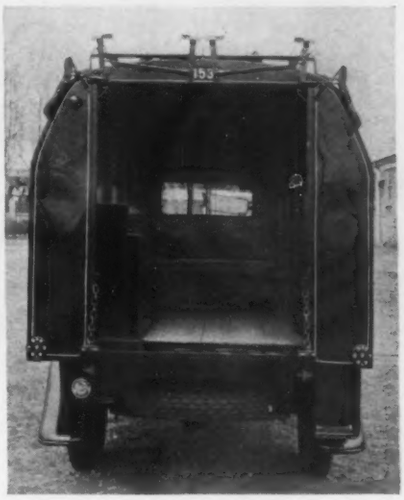
## Wall Map Helps Crew Foreman

An 8-ft.-5-in. x 8-ft. wall-mounted dispatching map showing 4,800-volt primary circuit in the city of Kalamazoo, Mich., has been placed in the line foreman's room at the service building of the Consumers Power Company to aid operating crews in picturing system conditions in time of trouble or emergency.

**Map of primary circuit helps line foreman to visualize system condition during emergencies**

The map, built at a cost of less than $300, has each circuit drawn in ink of a different color and each switch position is indicated by a brass eyelet. A red peg in each eyelet represents a closed switch, an eyelet without a peg means an open switch. The map is drawn on smooth medium drawing paper 58 in. wide.

## Ladder Clamps on Truck Top



Boston Edison line truck, equipped with overhead clamps to lock ladders in place on top without danger of working loose. The toggle arrangement shown provides a tight lock for two ladders and instantaneous release for service.

•

## Weatherproof Wire and Cable*

Kansas City Power & Light Specifications

### V—Standard Stock Sizes

The following is a list of sizes standard with this company:

| Spec. Item No. | Size | Stranding | Insulation |
|---|---|---|---|
| 1. | No. 8 | Solid | T.B.W.P. |
| 2. | No. 6 | Solid | T.B.W.P. |
| 3. | No. 4 | Solid | T.B.W.P. |
| 4. | No. 2 | Solid | T.B.W.P. |
| 5. | No. 1/0 | 7-strand | T.B.W.P. |
| 6. | No. 3/0 | 19-strand | T.B.W.P. |
| 7. | 250,000 C.M. | 19-strand | T.B.W.P. |
| 8. | 500,000 C.M. | 37-strand | T.B.W.P. |
| 9. | 1,000,000 C.M. | 61-strand | T.B.W.P. |
| 10. | 1,250,000 C.M. | 61-strand | T.B.W.P. |

*The fifth of a series of five covering specifications to get single-conductor wire and cable that can be installed throughout the year and which will give reasonably long service.

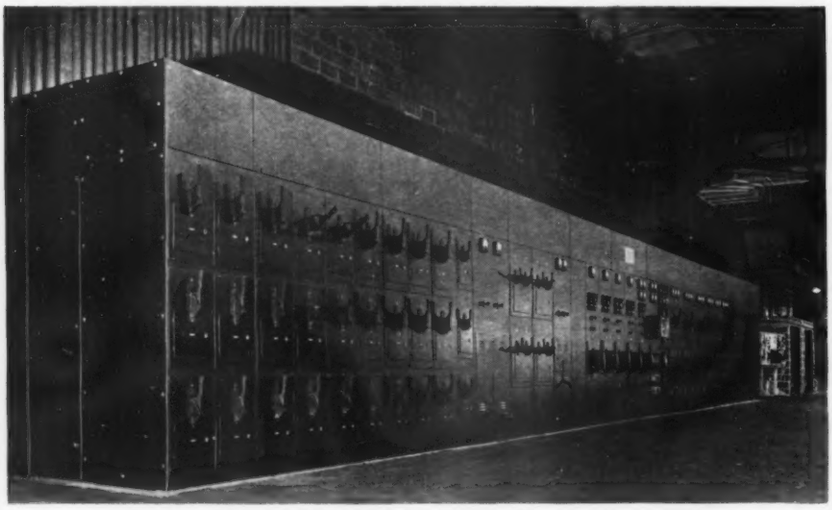
# INDUSTRIAL ENGINEERING

## Dead-Front Board Safeguards Saw Plant

Centrally located to provide for minimum wiring investment cost and convenience in installing circuits in future extensions, the main switchboard at the new windowless factory of the Simonds Saw & Steel Company, Fitchburg, Mass., was designed to control all electric service in a 5-acre room under a single roof with maximum safety to visitors and employees.

The board is of the steel dead-front type, 66 ft. long, totally inclosed and has locked doors at both ends. Just inside the west wall of the building, it will be accessible for future circuits in case the company builds additional plant on vacant land at the west of the present structure. Also, it is in close proximity to the present 5,000-kva. outdoor transformer installation, which receives energy from the local utility at 13.2 kv. A 500-kva. Diesel-electric plant owned by the Simonds company supplements the purchased power, being used chiefly for lighting and air conditioning.

From the main switchboard energy is distributed at 2,300 and 440 volts, three phase, 220 and 110 volts, single phase. All terminals and buses are at the rear and inaccessible except to authorized employees. The plant connected load is about 6,000 hp. Motors of 50 hp. and over operate at 2,300 volts, fractional-hp. motors at 110 volts and others at 440 volts. More than 30 miles of wire and cable have been installed in the plant, and the 440-volt system of distribution is carried from the switchboard and down the building columns through fused panels to an underfloor duct system spaced on 10-ft. centers and with openings every 2 ft. Numerous electric furnace panels in the plant are fed from the 220-volt buses by underground connections from the switchboard, and the 2,300-volt feeds run underground from the switchboard to the machine control panels. Lighting panels on the columns are fed at 110-220 volts by overhead circuits in conduit.



Metal-clad switchboard controls all electric services in 5-acre saw plant

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## Timed Heating Speeds Wood Bending

By O. R. OWENS
Plant Superintendent
Wells-Gardner & Company, Chicago

Automatic pre-set electrical control of both time and temperature are dominant factors in the design of an automatic plywood bending press developed at this plant to replace the old-fashioned steaming and clamping method of bending round corners in hardwood panels for radio cabinets.

The new machine has reduced the cost of this operation in the ratio of about 4.5 to 1 over the old method, which required that panels, after they had been steamed and bent to the proper radius, be clamped and allowed to set for upward of ½ hour. Now in ½ to 1½ minutes after a panel is placed in the press it may be removed with the bend complete. Where formerly year-around boiler operation with coal as fuel was required to generate steam for the bending process, now boilers are operated with sawdust and wood refuse during the winter months for heating only.

The machine that made these economies possible consists fundamentally of two sets of compressed air operated rams, one that holds and another that slowly bends the plywood panel upward around a hollow steel cylinder or bending roll heated from within by a thermostatically controlled, specially designed strip

[*Continued on page 73*]

**Electrically timed and heated plywood bending press forms radio cabinet panel in 31 seconds.**

Flat panel is inserted under electrically heated bending roll. Operator steps on treadle valve, raising pressure bar that holds the panel against the heated roll. Another valve starts bending table slowly upward, bending the panel around the hot roll, where it stays until released by timing relay 31 seconds later. Roll is 40 in. long and contains 4,200-watt special strip heater.

heating element with 65 turns to the inch at the ends and 35 at the middle.

The panel is held against the heated roll long enough to vaporize latent moisture in the wood and "set" the glue that holds small square plywood stiffeners to the inside of the bend. After this pre-set time period has elapsed a time-control relay releases pressure on the rams and the panel is removed from the machine with the bend complete.

Diameter of the electrically heated bending roll, its length and the size of the strip heater vary the type of work being done. The bending rolls are removable. They vary in diameter from less than 2 in. to more than 10 in., in length from 40 to 100 in. and in electrical capacity from 1,000 to 4,200 watts.

### *Control of Temperature*

Temperature at which the bending roll is operated is controlled within 10 deg. by a thermostat, tube of which is stapled to the outside of the bending rolls. Critical temperature is determined by the type of glue used and the time required for it to "set." For our purposes either a phenolic resin glue or a urea resin glue is used.

With the phenolic resin glue temperatures between 300 and 400 deg. may be used with time to set varying inversely with the temperature from ½ minute to 1¼ minutes. With the urea resin glue temperatures between 250 and 300 deg. are used, with the time varying from ¾ minute to 1½ minutes. Generally, the higher the temperature the easier it is to make the bend and the shorter is the time required to set the glue.

•

## Two Voltages From One Transformer Bank

**By H. N. LUCAS**
Manager General Mill Section,
Westinghouse Electric & Manufacturing Company,
Philadelphia, Pa.

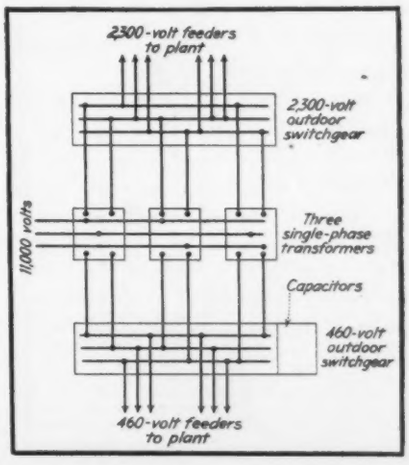
While transformers with dual secondary voltages are not new, their use is not common; a bank of three transformers delivering two feeder voltages at a large Southern plant provides economies of cost, space and a simplification of layout. These transformers constitute the substation for a new section of the plant which uses 2,300 volts for motors of 50 hp. and larger and 460 volts for all smaller motors. Incoming power is 11,000 volts, three phase, 60 cycles.

Ordinarily, a substation for such a plant would have used two transformer banks and indoor switchboards to supply the two plant voltages. As in most cases with a new industrial plant, it was difficult to predetermine the actual transformer requirements. Usually an estimate is made and transformers of the next larger standard rating are purchased.

In this case it was estimated that three 667-kva. (2,000 kva. total) transformers would be required, consisting of about 8,000 kva. at 2,300 volts and 1,200 kva. at 460 volts. If separate transformer banks were used a total of 2,500 kva. would be required. Instead, three single-phase transformers, each with two secondary windings, were applied. These transformers were designed for 1,000 kva. at 2,300 volts and 1,500 kva. at 460 volts, with the total load not to exceed 2,000 kva. This gave the engineers a factor of safety in the selection of loads.

Power is supplied by one high-voltage circuit from the power house. No outdoor low-voltage bus structure is used, since the two leads—for each voltage—are taken through roof bushings of the outdoor switchgear and the delta-phase connection made on the switchgear bus.

The cost of the transformers themselves—even though specially wound—is less than for two separate banks. In addition, the one bank of transformers can be, as in this case, on one feeder from the power house without a high-voltage breaker at the transformers. If two separate transformer banks had been used, then two feeder lines would have been required, or, if on one circuit, two high-voltage breakers at the substation.




**Simplified diagram of three single-phase transformers supplying two feeder voltages**

The ground space occupied by the substation also was considerably less than with the conventional switchhouse and indoor switchgear arrangement.

# NEW ENGINEERING IDEAS

## Copper Shot Makes Sharper Weld X-Rays

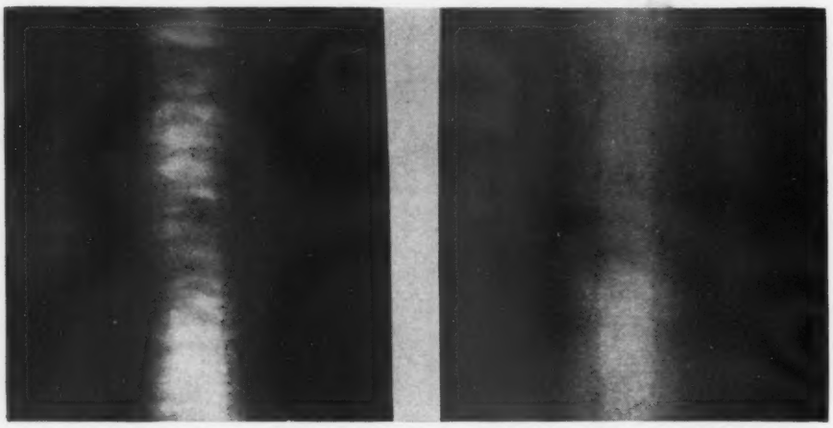
Metal shot, some so fine they float on water, are an aid to obtaining sharply defined X-ray photographs of irregular metal objects in the Schenectady Works laboratory of the General Electric Company.

Should a radiograph of a monkey wrench be wanted, for example, tiny shot is poured around and over it—spherical particles of copper or steel so small that 10,000,000 of them nestle together in a cubic inch. The photograph obtained in this manner has all the edges of the part sharply outlined. Had a similar photograph been made with the wrench simply resting on the X-ray negative holder in the air the resulting picture would have very fuzzy or blurry edges outlining the tool.

The explanation, according to C. D. Moriarty of the laboratory, is that there is such an emphatic difference in the absorption of X-rays by air and by metals that the part of the negative not in back of the metal is necessarily overexposed, with the result that the exposure "spills over" and blurs the edge of the object. Again, when the object being examined has some sections much thinner than other parts, there is a similar fuzziness of edges.

One way of overcoming this difficulty in the past was to use a film of low contrast value, with special filtering screens and relatively long exposures. Even so, the radiographs would lose considerable detail and contrast. Another way was to immerse the article under examination in a solution of lead acetate or similar compound more opaque to X-rays than is air. While such liquids improved the sharpness and contrast of the photographs, they still left room for improvement, since none of the liquids was of opaqueness approaching that of the metal. A third method has been building a block of special lead-bearing putty around the object; non-uniformity of the putty handicapped this technique.

Now, utilizing metal shot, an almost unlimited range of absorption coefficients is obtainable, depending on the metal used. The uniform packing of the fine spherical particles assures homogeneity. Short-exposure films with intensifying screens can be used and greater contrast and detail obtained in the photograph.



**Ripples and fuzziness (left) obscuring internal defects in radiograph of weld with uneven reinforcing head are eliminated (right) by "blocking" with fine copper shot**

•

## Service Wye Located by Reluctance Device

Underground distribution systems are frequently built in Brooklyn, N. Y., streets prior to the actual installation of underground services to buildings on these streets.

Usually this is done on streets in advance of paving or repaving where it is known that future plans call for putting the system underground.

To provide for the installation of services, the standard practice of Brooklyn Edison Company is to lay a single 3-in. wood duct parallel to the curb. Branch connections are placed at locations where it is expected that services will be required. These branch connections are split-iron castings known as wye connections and their installation permits pulling the service cables for several buildings through the one main service duct.

When underground service to a building on these streets is required it is necessary to know the exact location of the wye connection at the curb. Frequently the recorded and the actual location of the connection differ, resulting in wasted time and effort in locating the point at the curb where the service pipe should go.

To overcome this an employee of Brooklyn Edison Company, Inc., developed the service wye locator. This locator, shown in detail in the drawing, consists of 500 turns of No. 28 wire wound on an H-type laminated core, measuring $8 \times 2\frac{1}{2} \times 1\frac{1}{4}$ in. This provides adequate clearance for irregularities in the 3-in. duct and

## *Check these Points to See—*
## *Extra Values in KEARNEY*

# TRIPOMATIC CUTOUTS

THERE'S really no secret as to why operating men are finding that they get fewer cartridge burn-outs, more dependable protection and greater continuity of service when they specify Kearney Tripomatics. The successful operation of these cutouts is simply a matter of proper materials, skillful workmanship and careful engineering design—

*featuring*

SWIVEL HANGER—all round, clamp-type —strengthens the crossarm. Swivel joint permits facing box toward lineman. Hanger bolted to porcelain.

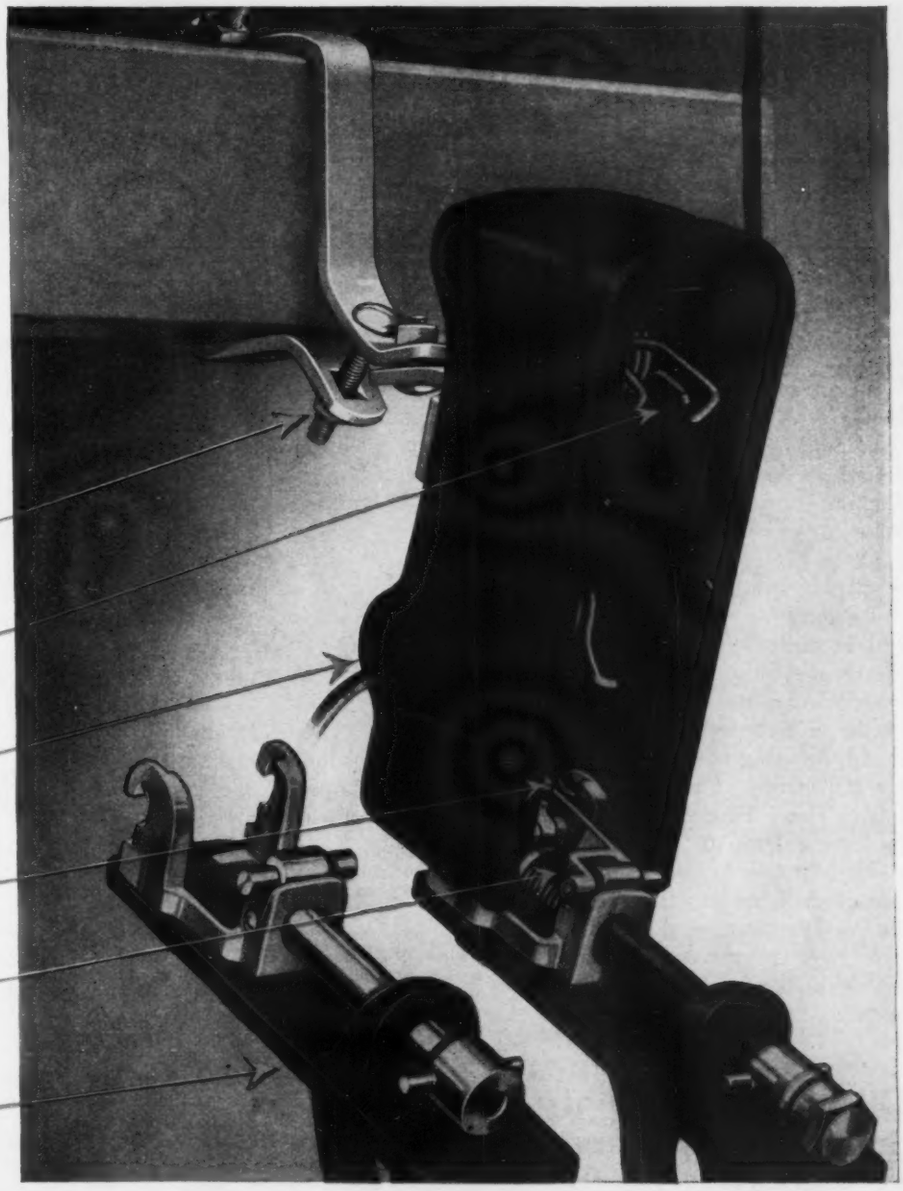
UPPER CONTACT — Kearney Point Pressure Type, is combined with latch.

LEAD CONNECTIONS — made by clamp-type terminals set in apertures at the back of the box and separated from the cartridge chamber proper.

DEAD HINGE—Illustration shows clearance from lower contact. Door is provided with large pull ring.

LOWER FUSE TERMINAL—pressure type contact which eliminates use of wing screws.

DISCONNECT DOOR—Provided with copper blade — Interchangeable with fuse cartridge door assembly.



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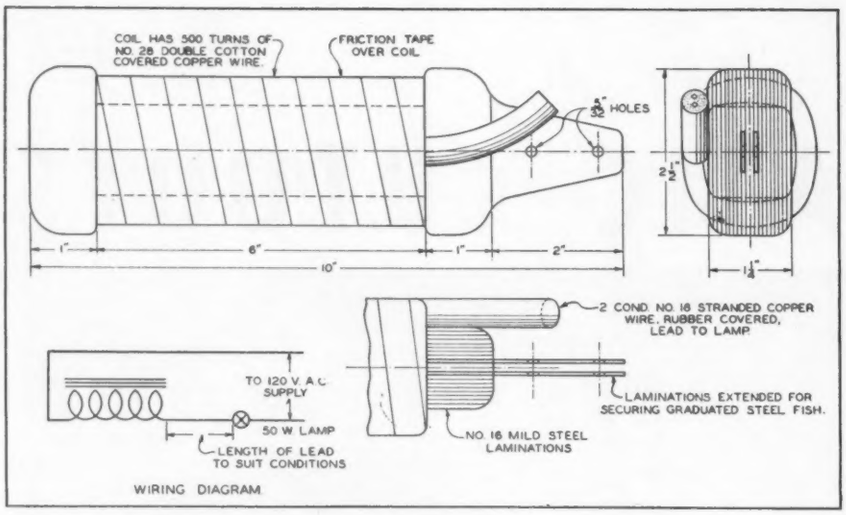



**Impedance change indicates proximity of metal service wye in wood duct**

the wye connections. The winding is connected in series with a 50-watt lamp, across 120 volts a.c. The assembled coil is attached to a ½-in. steel fish, marked off in feet. The lamp, connected in one leg of a two-conductor, No. 18 rough service cord, is hung at the manhole and the cord extends to the coil and to the current supply.

To locate a wye connection the coil is pulled through the duct by means of the fish. When an iron wye connection is reached the reluctance of the coil's magnetic circuit is reduced, bringing about an increase in the impedance of the electrical circuit. This increased impedance causes the lamp to dim. It is then a simple matter to get the exact location of the wye connection by noting the measurement on the fish.

A reel is provided to facilitate storage of the service cord when not in use.

•

## Oil Temperatures of Small Transformers

By **FRANK D. BROOK**
American Gas & Electric Service Corporation, New York

There have been many worthy developments added to the original technique of testing and reconditioning high-voltage insulations since the introduction of the Doble power-factor test principle some ten years ago. Each year, as additional data and new ideas are accumulated, the test procedure and the resulting analyses are becoming more and more simplified and dependable.

It is now an accepted fact that in order to draw the proper deductions from power-factor test results it is absolutely necessary to take into consideration the temperature of the material being tested. Small transformers not equipped with gauges are found to have oil temperatures which vary as much as 14 deg. from the ambient. A definite relationship exists between the ambient, the contact and the top oil temperature, any one of which can be calculated by measuring the two others.

A fairly accurate top oil temperature can be obtained by the following "contact" method which avoids the necessity of opening the transformer to ascertain the oil temperature:

(a) Insert the thermometer into half a solid soft rubber ball about 2 in. in diameter which has a small hollowed center. It is placed in such a manner as to have the bulb protrude slightly beyond the plane formed by the center cut, then when the ball is pressed against the metal tank only the metal temperature will be recorded. The rubber acts as an insulation against the temperature effect of the surrounding air.

(b) This device has been used on many power transformers wherein the gauge temperature was as much as 30 or 40 deg. C. higher than the ambient and always the contact temperature was very close to half way between the two. Even when the oil temperature is lower than ambient the contact still shows an average of the two.

(c) In order to be consistent with the results and obtain the most accurate readings, the ambient should be measured in the shade at approximately the same elevations as the transformers. The contact temperature should be measured at a point near the top but below the oil level and should also be on the shady side of the transformer.

(d) When the transformer has corrugated sides the ball can be wedged between two of the fins or if the transformer has a smooth surface the ball can be held in place by either pressing the fingers against the rubber or by means of a small piece of spring steel with suction cups at both ends.

•

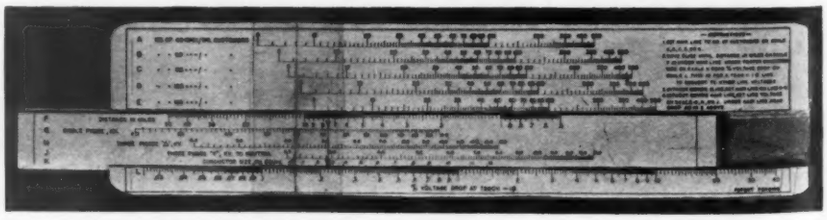
## Slide Rule Speeds Rural Line Design

By **ELLSWORTH J. JOHNSON**
Washington, D. C.

The use of troublesome and bulky charts or tedious calculations ordinarily necessary in determining conductor sizes on rural projects may now be avoided by means of a new voltage regulation slide rule. Developed by C. W. Burton, an engineer for the Rural Electrification Administration, the rule consists essentially of a new application of the logarithmic charts ordinarily used.

To use the rule, the hairline is set on the number of consumers in the branch of line being calculated, as found on the scale corresponding to the monthly kilowatt-hour consumption estimated for these consumers. The slide is moved so that the number of miles of line in the branch falls under the hairline; opposite the copper equivalent of the conductor being considered is found the per cent voltage drop at 7,200 volts, single phase, for the known and estimated conditions.

For other voltages—single phase, three phase wye or delta—it is necessary only to reset the slide so that the line "V-V" falls under the hairline, reset the hairline so that it lines up with the desired voltage on the proper scale and read the per cent voltage drop directly. To find the copper equivalent when the limiting voltage drop is known, a reading is taken of the copper equivalent which falls opposite the known per cent drop, after the rule has been set to suit the other conditions as described above.



**Voltage regulation slide rule helps determine proper size of rural conductors**

"Hook it up *today,*" that's how farmer Smith serves notice of increased load. Farmer Smith wanted an electric motor, he got it. He didn't give a thought to transformers. He looks to your pole line down the road to spin his new motor as readily as it lights his home.

Along many a rural line today, "Farmer Smiths" are putting transformers on the spot with short notice "hook-it-up" calls. That is why operating men are building transformer stocks carefully, looking at service records as well as the growing load. We invite you to check the remarkably trouble-free record of L-M Transformers on both rural and urban lines. And, to learn *first hand* what trouble-free, low cost transformer performance can really be . . . we suggest you feed the power for Farmer Smith's new motor through an L-M Rural Line Transformer.

# LINE MATERIAL CO.

# LOAD BUILDING

## Electric Boiler Saves Cost in 8.5 Months

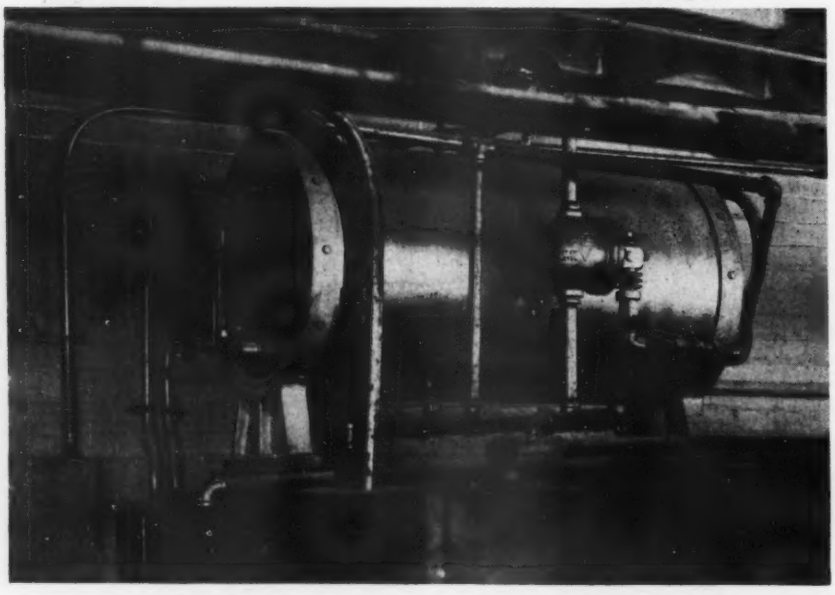
By H. H. STEINBERG
Boston Edison Company

One of the largest bakeries in Boston, the Supreme Market in Dorchester, works at top efficiency to produce 35,000 lb. of bread and sweet goods per week. Six ovens holding 140 pans each are in service. The bakers use live steam at relatively low pressure in raising dough and in producing crispy crust bread and rolls. Formerly the steam was delivered from pipes running over 200 ft. from the boiler plant, and when this wet steam was injected into the ovens it caused a loss of about 40 loaves of bread each week. When this steam was used in the "proofing box" the top rack of the oven could not be loaded and it was necessary for the plant engineer to come in Sunday evenings to raise the steam pressure required by the bakery at midnight. Operating the steam boiler in summer at a fraction of its rating meant poor efficiency.

In round figures, on an annual basis, the oil for generating steam for the bakery cost $300, the spoiled bread was worth $200 and the engineers' overtime came to $300, or $800 total.

A Commonwealth electric boiler of 24-kw. rating, operating on 230-volt Boston Edison service, was the answer. This was installed at a cost of about $350 at the point of use. The annual energy consumption cost about $300, making the total operating saving $500 per year and liquidating the investment in 8½ months. A year's experience backs up these figures.

With this installation, the electric boiler being placed on top of an oven, the steam pressure and feedwater supply are automatically controlled and no attendance is required. Adequate steam is available 20 minutes after throwing the switch. The elimination of long pipe lines results in dry steam and the uncertainty of results from wet steam is gone. The heat losses of the new unit are but 0.7 kw.-hr. per hour. The handy location gives the bakery operators full control of the process steam requirements. Luke Madden, in charge of maintenance, naturally wears a smile. He gets no more steam complaints from the bakery.



Steam generator in bakery good for $300 annual revenue to Boston Edison

•

## Far-Sighted Selling Adds Desirable Load

The well-established but too often forgotten principle that successful selling—of electricity or most anything else—depends upon long, careful cultivation of a field was clearly demonstrated in southern California this year. In Riverside County, served by the Nevada California Electric Corporation, fifteen out of 55 important turkey ranches made lighting installations ranging in most cases from 5 to 15 kw. each, and in one case approximating 50 kw.

The lights are used to give turkeys a midwinter and spring bath of ultraviolet light, thereby enabling growers to secure a higher percentage of fertile eggs and to look forward to the prospect of bigger birds by Thanksgiving.

This load which attached itself so suddenly to the corporation's lines was not a windfall. Factors which culminated in a demand for lighting in 1939 had been at work for years. The fact that the company was able to capitalize on the demand, and to render a valuable service at the same time, can be attributed to a salesman.

# "It's a BIG JOB to sell ADEQUATE WIRING *in* Old Homes *—but the* FUSTAT can help you do it"

## Stops overloading that hinders the full use of electricity

*The branch circuit is the "bottle-neck" of electric service, because through it flows all the "pay load" to the user. As this "bottle-neck" is overloaded, SATISFACTORY service diminishes because:*

**1. Overloading usually means a low-voltage condition that causes user dissatisfaction due to inefficient operation of lamps and appliances.**

**2. Overloading, when continued often destroys the wiring and causes money loss to the user — revenue loss to the Utility and tremendous loss of good will to the entire industry.**

## The Fustat steps in to help correct this overloading evil

Its non-tamperable feature shuts out "handy men" from substituting too large a size, and tampering it in any way to permit overloading is virtually out of the question — without such tampering being clearly visible where it warns the user that all protection is gone.

Since the user can't load a circuit beyond proper capacity of the copper, the Fustat eliminates revenue sapping low-voltage conditions —

And by blocking excessive overloading it prevents overheating that destroys wiring, creates fire hazards and causes costly shutdowns.

In addition, when a Fustat does blow to protect, only the *normal load* on one circuit is off the line — instead of a user possibly having a large part of his lights and appliances out of service.

### What is the Fustat?

Adapter retails at 7½c

It is a fuse to which a thermal cutout is added.

It protects like a fuse against short circuits — even high resistance shorts such as occur in flexible cords.

It protects against permanent overloads, even when as light as 25%.

**Yet it will not blow on motor starting currents of washing machines or other appliances.**

It has a non-tamperable base that keeps anyone from robbing the circuit of protection.

It fits Edison base fuseholders through the use of an inexpensive adapter.

### User can't side-step adequate wiring issue

When additional circuits are needed the user cannot readily side-step the issue at the sacrifice of safety. New circuits that increase efficiency of appliances and encourage their greater use must be installed.

### Permits more outlets per circuit

Adding a maximum number of outlets is a perfectly safe practice because the Fustat guards the circuit against overloading.

### Wipes out any excuse for tampering

A Fustat won't blow when washing machines, refrigerators or other motors start because of its long time-lag. It wipes out any excuse for tampering or the use of fuses too large to properly protect when shorts occur in flexible cords.

### Helps get more appliances on the line

The circuit can be loaded to approved capacity without needless blows — or sacrifice of safety — for the Fustat doesn't blow on starting currents.

***It's just good business to sell, install and use Fustats***

Retails at 7½¢ In 15 to 30 amp. sizes

# The FUSTAT

For Full information write to any of these firms

BUSSMANN MFG. CO., University at Jefferson, St. Louis, Mo.
JEFFERSON ELEC. CO., Bellwood, Ill.
KIRKMAN ENGINEERING CORP., 121 Sixth Ave., New York City
NATIONAL ELECTRIC PRODUCTS CORP., Fulton Bldg., Pittsburgh, Pa.
UNION INSULATING CO., 27 Park Place, New York City

F. C. Sollars, agricultural engineer of Nevada-California, who foresaw the demand almost ten years ago and who prepared himself to serve it and was ready when the time arrived.

Thus it was that this year, when market conditions were "right," Sollars was prepared to sell. This year some 7,000 turkeys are under lights in Riverside County.

Usual installation consists of type CX Mazdas in 100- to 250-watt units, placed 4 to 6 ft. above ground near roosts, feeders and water. Such units, producing milder ultra-violet intensities, permit longer operation at lower demand and prevent overexposure of the birds. They usually are operated ten to twelve hours per night through winter months, when there is little natural ultra-violet light and when birds tend to stay indoors.

With such installations, turkey raisers have been rewarded with a laying season which begins in January, whereas turkeys do not ordinarily start laying until March. They have earned a big return on a small investment in electrical equipment, and the utility has gained sizable loads which are on the lines for ten to twelve hours daily, during off-peak hours.

•

## Higher Intensities for Commercial Customers

A survey of lighting installation in many types of modern interiors show that 50 ft.-candles or more is now the rule. Progressive merchants, office managers, industrial plant executives, showmen, educators and health officers have found, by experience, that foot-candles more than pay their keep. New developments in lighting control equipment and lamps have made it possible to secure high values of illumination without glare and at reasonable cost. The movement away from primitive foot-candle values and toward common sense illumination has just begun and the day is not far off when foot-candle values below 100 will be relegated to the era of the horse and buggy.

The Grant store shown below and located in Minneapolis obtains 50 ft-candles and the jewelry store 93 ft.-candles.

•

## Installation Cost Protected for 2 Years

Customers of the Commonwealth Edison Company who move within two years after original installation of a range or water heater are now given the company's regular installation allowances toward the cost of reinstalling the equipment at their new address; provided, of course, that they are still to be served by the company.

Commonwealth Edison sales officials have felt that sale of ranges and water heaters to renters has been limited by the customers' fear of incurring reinstallation expense due to moves made a year or two after purchase. They feel that the new ruling has removed this sales barrier and that a much greater market for range and water heater sales in Chicago will result.

Allowances under the new schedule apply to one-, two- and three-family dwellings only and are said to be sufficient in the majority of cases to cover the total cost of domestic range and water heater installations in this group.

### *Allowances Stated*

Of the 842,291 families in Chicago, about 75 to 85 per cent are renters and 454,099 families, or nearly 55 per cent of the total, live in one-, two- or three-family dwellings and represent the potential market to which the allowances would be a buying incentive.

The Chicago census of 1934, from which the above figures were taken, also shows that 127,316, or 28 per cent of the families in one-, two- and three-family dwellings, had a length of residence of less than two years, 36 per cent less than three years and 55 per cent less than five years at the time the census was taken.

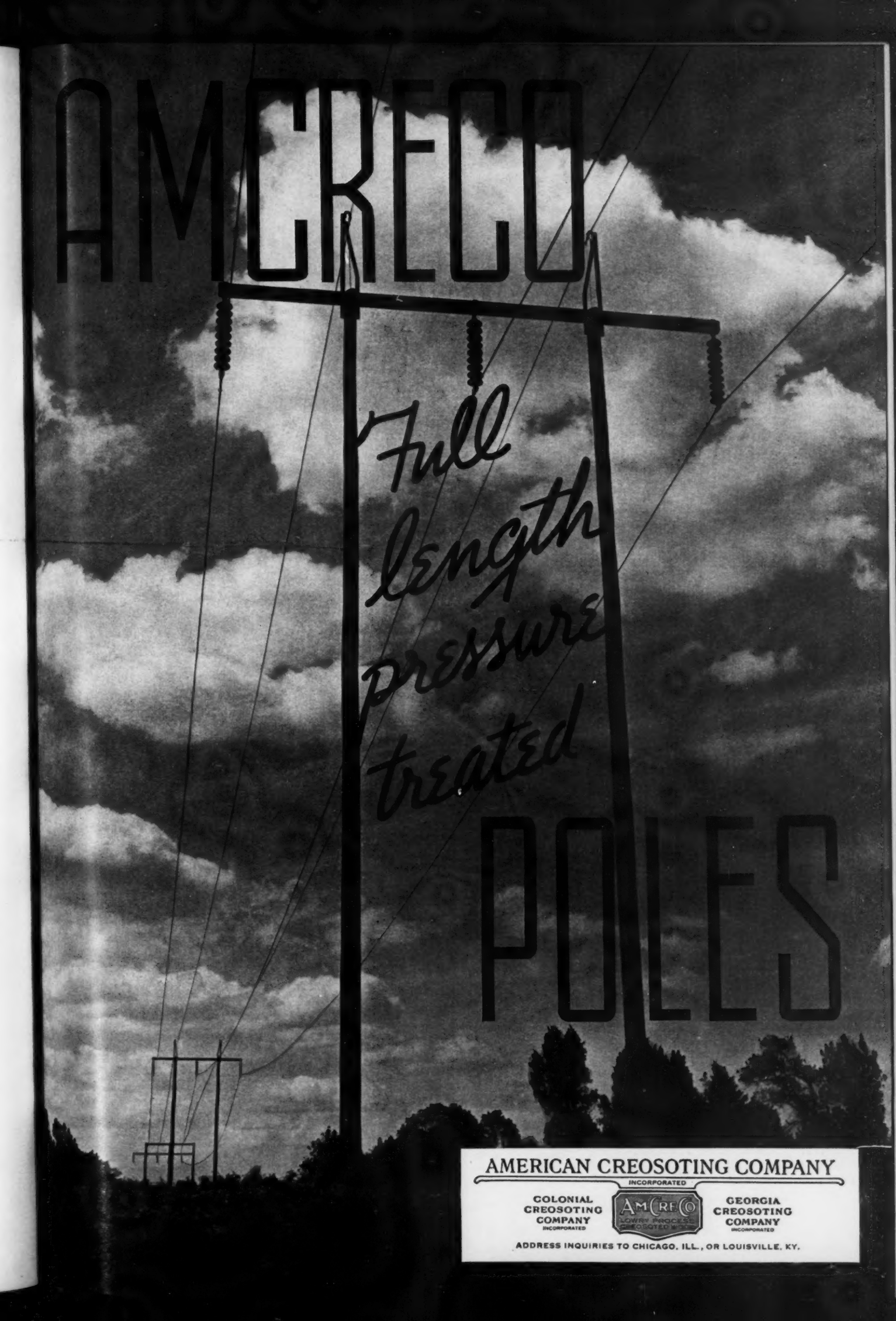
The amount of the allowances under the schedule are:

| | |
|---|---|
| Range circuit allowance, per range | $25 |
| Water heater circuit and plumbing allowance, per water heater | 43 |
| Service Wiring Capacity Allowance, per Building | |
| 1. Where meter was previously moved out-of-doors | 15 |
| 2. Where meter is moved out-of-doors with the installation | 10 |
| Additional Service Wiring Capacity Allowance, per Building (Applies to three-family dwellings only when capacity for three ranges is installed) | 7.50 |
| Meter moving allowance, per meter | 12 |

**Foot-candles make the cash register ring**

A totally indirect system using 500 watts per unit provides a general intensity of 93 ft.-candles and In-Bilt controlenses supply 78 ft.-candles on the display tables of this Portland, Ore., jewelry store.

W. T. Grant store in Minneapolis has a system of semi-flush controlenses installed on 8-ft. 6-in. centers with 300-watt lamps. Ceiling height is 9 ft. Illumination, as measured by Northern States Power Company, is 50 ft.-candles.




AMERICAN CREOSOTING COMPANY
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AMCRECO
LOWRY PROCESS CREOSOTED WOOD

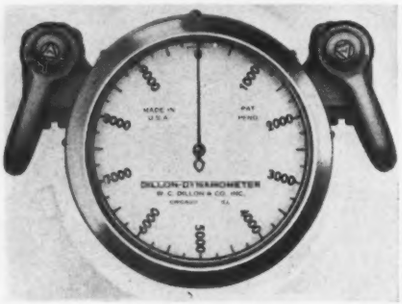
GEORGIA CREOSOTING COMPANY
INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

# NEW EQUIPMENT

## Traction Dynamometer

Power transmission cable, messenger or guy strand can be placed at the proper tension or sag quickly with this dynamometer, which is used in series with a block and tackle to register the pound pull



"Dillon" dynamometer; in 5,000 to 15,000 lb. capacities, tested to 100 per cent overload by manufacturer; weight 5½ lb. **W. C. Dillon & Co., Inc.**, 3551 Sheffield Ave., Chicago, Ill.

being applied to the cable, guy or messenger. Use of such an instrument avoids error in human judgment in guessing proper tension by judging sag, since it allows the wire to be pulled to the tension specified by the wire manufacturer for specific load strains.

•

## New "Variacs"

"Variacs;" Type 50-A, 5 kva., 115 volts input, 0-115 and 0-135 volts output; Type 50-B, 7 kva., 230 volts input, 0-230, and 0-270 volts output. **General Radio Co.**, Cambridge A, Mass.

With the two new models of this adjustable transformer, the amount of power controllable by a single unit is more than doubled, it is said. Industrial applications are included among suggested uses.

•

## Pole Finishing Process

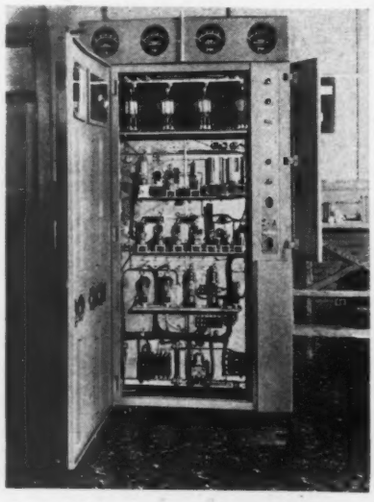
"Durapole." **Valentine Clark Corp.**, St. Paul, Minn.

To remedy sapwood deterioration caused by shell rot and premature failure of the above-ground section of Western red cedar poles, and for improved appearance, this company has developed a new pole-finishing process. Newly designed electric pole shaving machinery is used to reduce the thickness of the sapwood layer in the entire upper section of the pole—above the standard height of butt treatment—to less than ½ in. The machine-shaved cedar poles are then given a full-length immersion treatment in heated creosote, to accomplish endwise absorption of the creosote into the top end, up and down from the concave gains for the crossarms, through the bolt holes and into the season checks, and a liberal surface absorption of the creosote preservatives to protect the pole during storage in users' pole yards.

•

## Broadcasting Transmitter

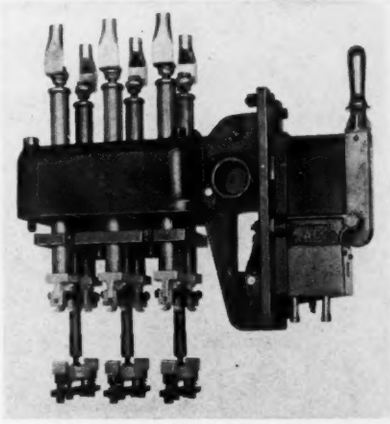
Efficiency of a 50-kw. equipment and the accessibility of a "breadboard" model is said to be provided in this new 1-kw. radio broadcasting equipment designed primarily for commercial service, including electric light and power company use. Use of the Doherty circuit is said to reduce greatly the power needed for operation and the stabilized feedback principle is said to provide, in the final radio signal, the clarity of the original audio signal. As a practical aid to operation and maintenance, all components are mounted on a vertical panel so that no element of the circuit is obscured by any other part. Heat-generating apparatus is mounted nearest the top. Hinged covers on either side of the panel protect the control knobs from accidental operation. Cabinet inclosing the unit is electrically independent of the central assembly structure except for three safety switches.



Type "443A-1" 1-kw. radio broadcasting transmitter; frequency range, 500 to 2,500 kc.; a.c. operation, power supply 187 to 250 volts, hand regulator. **Western Electric Co.**, New York, N. Y.

## Switchboard Breaker

Arrangement of the three poles of this new circuit breaker one behind the other (as viewed from the front) provides a bushing alignment said to avoid crossing



Type "KD-20"; tank in lowered position 50,000 kva. interrupting capacity; 600 amp.; at 15 kv., 1,200 amp. at 7.5 kv. and 2,000 amp. at 5 kv. **Allis-Chalmers Mfg. Co.**, Boston, Mass.

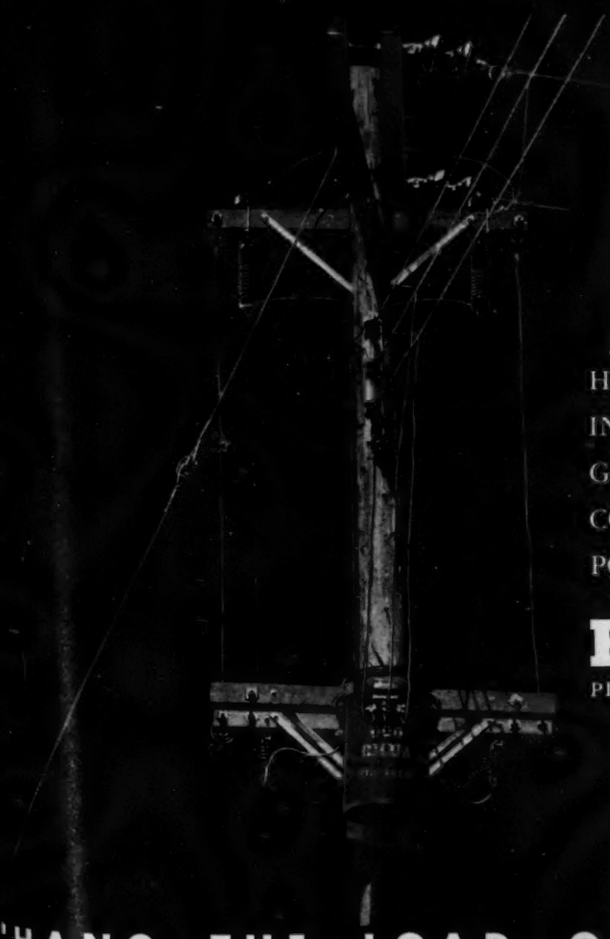
leads in certain applications of open and inclosed type switchboards. Breaker is equipped with large butt-type arcing contacts; main current-carrying contacts, silver-plated, are of the wedge-and-finger type for 600 amp. and wedge-and-liminated-brush type for 1,200 and 2,000 amp. Other features include Bakelain bushings, inclosed low-intertia, high-speed mechanism and vents to permit escape of gases incident to interruption.

•

## Mica Undercutters

"Direct Drive" undercutter, slots may be cut to within 3/16 in. of commutator riser, uses 11/16-in. saws or milling cutters with 5/16-in. hole; "Shop Type" undercutter, cuts slots to within ¼ in. of riser, uses ⅞-in. saws or cutters with 5/16-in. hole. **Ideal Commutator Dresser Co.**, Sycamore, Ill.

Two new types of power mica undercutters have been announced by this company. One, a direct-drive type, combines a universal motor and undercutting mechanism in one compact unit. It is intended for field or shop use where motor or brush rigging is not removed. On the other type, the undercutting mechanism is motor-driven through a flexible shaft and is designed for use on commutators that have been removed or on jobs where the brush rigging has been removed. Air nozzle on



HE WOULD HAVE BEEN AS INVULNERABLE AS HUBBARD DOUBLE-DIPPED HOT GALVANIZED POLE LINE HARDWARE—GUARANTEED COMPLETELY COVERED WITH SMOOTH, HEAVY NON-POROUS ZINC COATING.

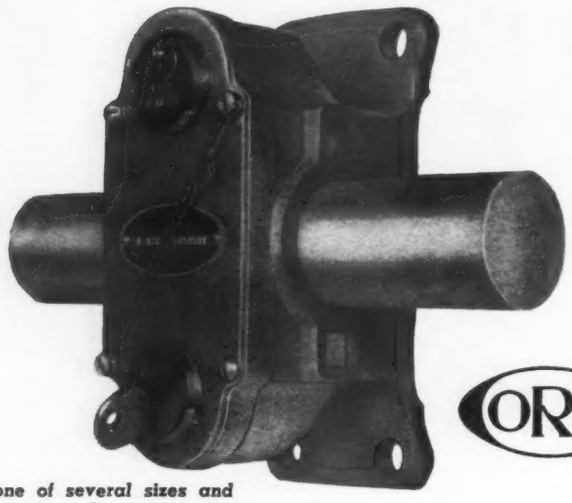
**HUBBARD AND COMPANY**

PITTSBURGH . . . OAKLAND CALIFORNIA . . . CHICAGO

"HANG THE LOAD ON HUBBARD HARDWARE"

# Protectors

## OF PERSONNEL AND PROPERTY




*Illustrated:*
***Type B-927—one of several sizes and types for all industrial requirements.***

## BENDIX-CORY INTERLOCKS

**FAR better — far cheaper — than paying insurance compensation! These reliable, key-actuated, self-contained locking units, for both indoor and outdoor use, are universal power-plant equipment.**

**Bendix-Cory Interlocks and Locking Units have many uses. The commonest are protection against:**

**(1) OPERATION of disconnecting switches when carrying load; (2) ENTRY to bus cells, oil circuit breaker tank compartments or enclosures for lightning arresters and neutral ground resistors, before switches have been opened; (3) CLOSING of ground and line switches simultaneously: (4) PARALLELING of two separate sources of electrical supply; (5) RE-CLOSING of motor starting switches when making machine repairs and other hazardous operating conditions.**

***Write for new catalog covering this and other safety equipment!***

## BENDIX AVIATION CORPORATION MARINE DIVISION

**754 LEXINGTON AVENUE** **BROOKLYN, NEW YORK**


this model keeps commutator free from dust. Both types have adjustable depth gage and roller guide.

•

## Carrier-Current Capacitor

Type "CA" carrier-current coupling capacitor; individual units made up to 46 kv.; may be stacked for higher voltages. **Cornell-Dubilier Electric Corp.**, South Plainfield, N. J.

Fog-type petticoats on this carrier-current coupling capacitor are said to provide a large creepage distance between terminals. Iron mounting flanges permit stacking of units for series high-voltage connection. Capacitor sections are designed for low resistance at high frequencies and very low 60-cycle stress, according to the manufacturer. New internal mechanical construction makes for great tensile strength; base and top are sealed to make for leakproof service.

•

## Terminal Connector

One-piece assembly of this new terminal connector guards against loss of loose parts. Pressure strip prevents clamping

Type "KPA Scrulug"; for conductor sizes from No. 14 to 4/0. **Burndy Engineering Co., Inc.**, New York, N. Y.

screw from damaging the conductor. Entire connector is tinned to prevent corrosion and discoloration.

•

## "Packaged" Generator

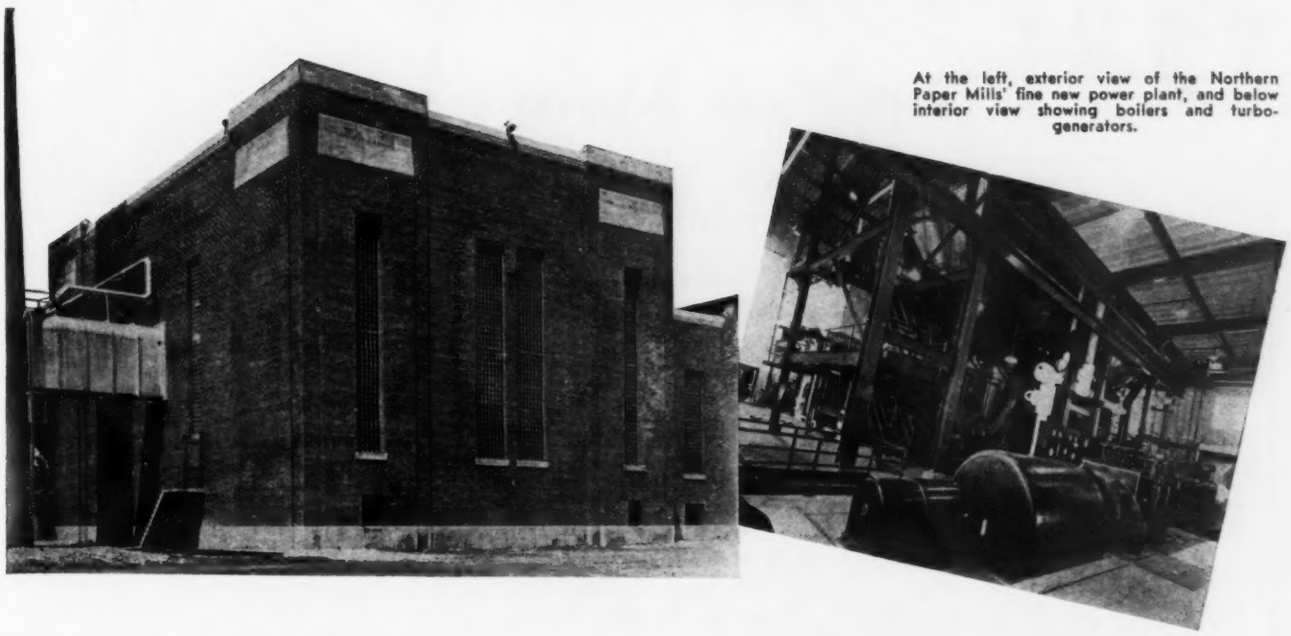
"Packaged" generator; in ratings from 10 kw. to 100 kw. at standard low voltages; from 20 kw. to 100 kw. at 2,200 volts. **Electric Machinery Mfg. Co.**, Minneapolis, Minn.

Voltage control and generator voltmeter and ammeter are mounted on this "packaged" generator and wired to it; thus leads from the generator can be run to the load through a wall- or floor-mounted generator switch, eliminating the more customary switchboard. Exciter is either mounted on and V-belt driven by the generator or direct-connected to the generator.

•

## Induction Motor

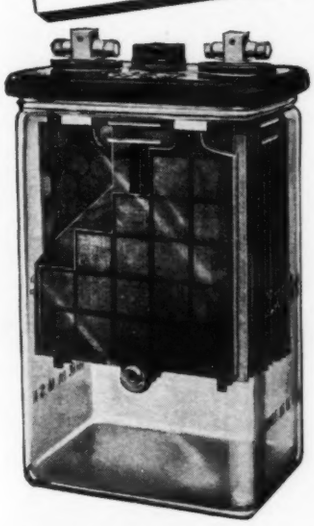
New design for heavy-duty induction motors features quiet operation, minimum windage noise and radio-frequency tested insulation. Particularly designed for centrifugal pump and compressor drives, mo-



At the left, exterior view of the Northern Paper Mills' fine new power plant, and below interior view showing boilers and turbo-generators.

# ONCE AGAIN THE PAPER INDUSTRY SHOWS ITS PREFERENCE FOR EXIDE CONTROL BATTERIES

Exide
CHLORIDE
BATTERIES



Single cell of an Exide-Chloride Battery. This cutaway view shows the remarkable Manchester positive plates and Box negatives—important reasons for this battery's exceptionally long life.

**THE Northern Paper Mills of Green Bay, Wisconsin, has had a wide experience with both hydro-electric and steam plants. Consequently when its management decided to replace its existing facilities with a fine modern plant, that experience was reflected in the high quality of the equipment specified.**

**From its two boilers each capable of generating 75,000 pounds of steam per hour and its two turbo-generators (one of 2000 and the other 3000 k.w.), down to the smallest valve and tiniest indicating light, every item selected was the finest and most dependable known to the engineering profession.**

**It was only natural, therefore, that a 60-cell Exide-Chloride Battery should have been selected for all control and emergency lighting service.**

**For Exide-Chlorides are the predominant choice of consulting and operating engineers everywhere—men who know the importance of quality and dependability in the batteries they specify for stationary service. We have prepared a booklet describing this battery and explaining some of the reasons for its exceptional life and performance. We believe you'll be interested in a copy; if so, write for Bulletin 204.**

## THE ELECTRIC STORAGE BATTERY CO.

*The World's Largest Manufacturers of Storage Batteries for Every Purpose*

**PHILADELPHIA**

Exide Batteries of Canada, Limited, Toronto

# SAVE Time and Money

*and do a Better Job of Bending Conduit*

**Greenlee Hydraulic Conduit and Pipe Benders not only save time, but they make smooth, even bends, making it easier to pull in wire and cable. By using hydraulic pressure, which is set up by pumping the handle, it was possible to make these tools very compact, easy to handle, and simple to operate. They are built in two sizes for conduit from 1¼ to 3-inch and from 3 to 4½-inch.**

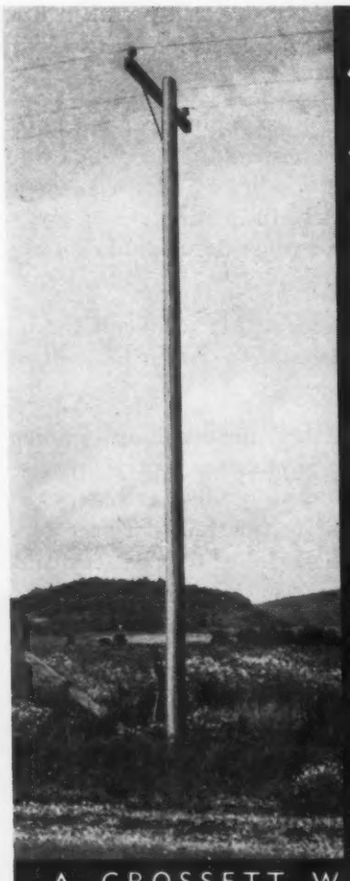
***Let Us Tell You All About These Tools***

**Complete information on Benders will be sent gladly. And if you don't have a copy of our catalog showing other tools for electrical construction, ask for one now.**

**Bending conduit and pipe with a Greenlee Hydraulic Bender is as easy as the above photo indicates. It is readily portable and simple to set up and operate.**

GREENLEE TOOL CO., 1705 Columbia Ave., ROCKFORD, ILL.





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# "DIXIE"

*Dense Longleaf*

# POLES

*have all the answers*

Produced from our own forests which are on a sustained yield basis. Unsurpassed for strength and durability. Thoroughly seasoned. Uniformly graded. Ample stocks assure prompt deliveries on schedules of any size. Available untreated or vacuum-pressure treated — Creosoted or "Wolmanized"

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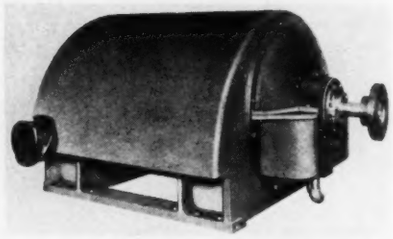
A CROSSETT WATZEK GATES INDUSTRY

Type "CS" two-pole, 1,000-hp. induction motor; design available for 3,600-r.p.m., 600-3,000-hp. motors. Dept. 7-N-20, **Westinghouse Electric & Mfg. Co.,** East Pittsburgh, Pa.

tors are built for starting at full or reduced voltage and deliver normal starting torque with normal starting current. Dynamically balanced rotors, permanently aligned bearings and directed ventilation for cool running are other features.

•

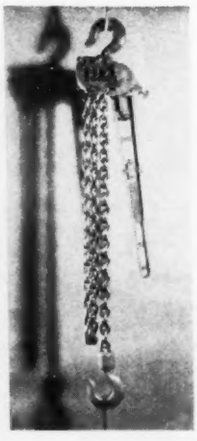
## Tandem Switch Assemblies

Tandem assemblies for power tap switches, 10, 20, 40 and 75 amp., 240 volts a.c. **Ohmite Mfg. Co.,** Chicago, Ill.

Tandem assemblies of 2, 3, 4 or more of this company's new tap switches (see ELECTRICAL WORLD, July 15, 1939, page 78) are available. These tandem assemblies are used to switch both sides of a single-phase line or to switch all phases of a three-phase line, to provide simultaneous control of separate circuits and for other applications.

•

## Load Puller



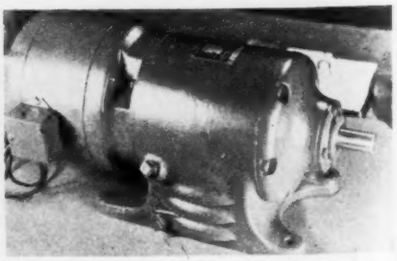
With this lightweight, spur-geared puller, 43 lb. of pressure will lift a ¾-ton load, according to the manufacturer. It features a ratchet handle and friction brake, with button control providing "free wheeling." Working parts and brake are inclosed in dustproof, grease-tight housing.

"Tips Tugger;" in ¾- and 1½-ton capacities. **A. B. Chance Co.,** Utilities Division, Centralia, Mo.

•

## Speed Reducer

As an addition to its line of motorized speed reducers, this company has brought out a straight-in-line unit for application



Type "SME Ratiomotor"; offered with five output speeds from 108 to 276 r.p.m.; motors operate on 110, 220 or 440 volts. **Boston Gear Works, Inc.,** North Quincy, Mass.

# DANGER

# RUST AT WORK

RUST is working *everywhere*. RUST is working *all the time*. RUST never sleeps. Its destructive work goes on relentlessly on rustable guy strands. But there is a simple economical answer to your rusting problem — use non-rusting Copperweld strand for all your guys.

Copperweld guy strand is protected from rust by a thick layer of pure copper inseparably molten welded to a tough steel core. Copperweld guy strand is doubly guaranteed; first, a guarantee of copper thickness on every wire; second, a guarantee that the finished strand will have the rust resisting life of solid copper.

*A new eight page data booklet recently published contains information on physical properties of Copperweld strand, also installation suggestions and a convenient graphical method of determining the required strength of guys. If you haven't received a copy, write for Engineering Data Booklet E. D. 1686.*

COPPERWELD STEEL CO., GLASSPORT, PA.

# COPPERWELD

*non-rusting*

# SAFETY

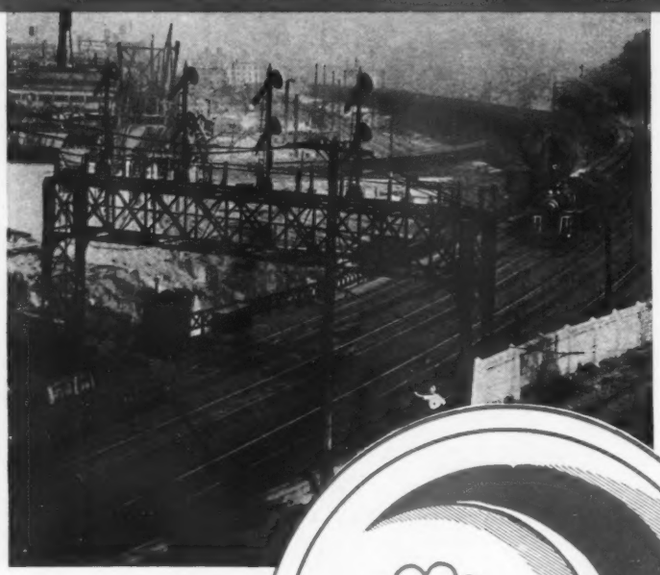
# GUY STRAND

RUBBER COVERED POWER CABLES • BUILDING WIRE

CRESCENT
INSULATED WIRE and CABLE

VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE

CRESFLEX NON • METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE



*Railroads Use It!*

To give added safety to their greatest slogan, SAFETY FIRST, many of our country's great railroads give CRESCENT Wire and Cable the "right of way."

In our multi-conductor Railway Signal Cables, you'll find every reature of toughness and durability that makes for long life under severest duty — exposed to all weather or buried underground.

CRESCENT
INSULATED WIRE & CABLE CO. INC.
TRENTON, NEW JERSEY

Atlanta Baltimore Boston Buffalo Chicago Cincinnati Cleveland
Detroit Indianapolis Kansas City Los Angeles Minneapolis
New Orleans New York Philadelphia Pittsburgh St. Louis San Francisco

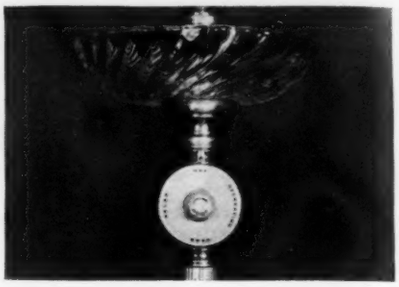
CRESCENT ENDURITE SUPER • AGING INSULATION

to machinery where a high-speed motor may not be used. Using either a ½- or a ¾-hp., 1,800-r.p.m., 60-cycle motor, unit provides various output speeds through a double reduction drive.

•

## New Lamp Switch

New "finger-tip light control" feature of its floor lamps "puts a utility home lighting adviser in every home" in the words of the manufacturer. Made of white



"Finger-tip light control." **The Miller Co.**, Meriden, Conn.

plastic and placed below the shade for easy reaching, the switch has four positions. Turning it to "relax" gives 100 watts; another turn to "recreation" provides 200 watts, while a third turn to "read" furnishes 300 watts.

•

## Portable Floodlight

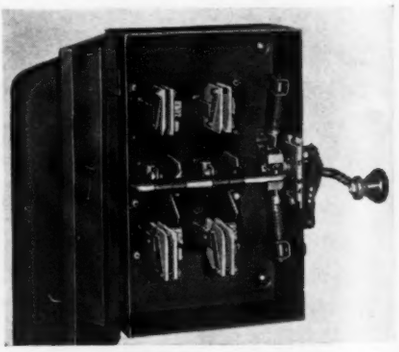
Type "L-38 Novalux" floodlight; 250-watt; weight, 20 lb. **General Electric Co.**, Schenectady, N. Y.

Designed for temporary or emergency illumination, a new 250-watt inclosed portable floodlight is equipped with a trunnion bracket on a 12-in. circular base. Alzak-processed aluminum reflector is inserted in aluminum housing with glass door offered in plain, lightly or heavily stippled and spreadlight types.

•

## Type A Switches

New line of unfused Type A double-throw switches features quick make and break, cover interlock and padlocking divisions for three padlocks in the "off" and



Type A double-throw switches 60, 100 and 200 amp., two and three pole; 230 or 275 volts a.c. and 250 volts d.c. **Square D Co.**, Detroit, Mich.

both "on" positions. Of unit-base construction, the switches have the new V-type blade, multi-spring jaws and compression spring construction of this company's switching mechanism.

# MANUFACTURING - MARKETS

## Anaconda Wire Shows Net of 31¢ a Share

A substantial profit was shown by Anaconda Wire & Cable Co. and subsidiaries for the June quarter as compared with a loss in the same 1938 quarter, according to preliminary report.

Net profit for the quarter was $131,293, after depreciation, obsolescence and federal income taxes, equal to 31 cents a share on 421,981 shares of capital stock. This compares with net loss of $172,343 in the June quarter last year and net loss of $77,161 for the March, 1939, quarter.

Total income was $826,638, against $484,156.

PHELPS DODGE CORP. and subsidiaries report for the first six months net profit of $4,601,038, or 91 cents a common share, as compared with $3,830,588, or 75 cents a share in the same 1938 period.

HOLOPHANE CO. INC., reports for fiscal year ended June 30 estimated net profit of $175,035, equal after dividend requirements on $2.10 preference stock, to $1.49 a share on 98,444 shares of common stock, against net profit of $221,445, or $1.93 a common share in the preceding year.

MINNEAPOLIS-HONEYWELL REGULATOR — Including subsidiaries, six months to June 30: Net income, $355,067, compared with $142,907 earned last year. June quarter: net income, $287,777, against net income of $160,317 in the same quarter a year ago.

ELECTROLUX CORP.—Reports for first six months this year net profit of $818,611, equivalent to 66 cents a capital share, against $1,211,705, or 98 cents a share, in 1938 period. Net profits for the June quarter totaled $374,697, or 30 cents a share, against $543,458, or 44 cents a share, in the 1938 quarter.

•

## Manufacturers' Sales Gain 17% Over First Half of '38

Manufacturers' sales of electrical machinery, apparatus and supplies during the first half of 1939 totaled $108,774,000, a gain of 17.0 per cent over the same period a year ago, according to the Department of Commerce. For all industries reporting, manufacturers' sales totaled $1,701,615,000, a gain of 13.1 per cent over the first six months of last year.

Manufacturers' sales of electrical machinery, apparatus and supplies during June amounted to $34,229,000, a gain of 1.0 per cent over May and of 23.6 per cent over June, 1938. These increases compare with 2.2 per cent and 17.5 per cent for all industries reporting.

•

## Westinghouse Gets Order for Four Mill Motors

Electric drive equipment designed to operate a four-stand tandem cold reduction strip mill at rolling speeds higher than any now in use for this type of mill has been ordered from Westinghouse Electric & Manufacturing Co. for a relocated mill of Weirton Steel Co. at Weirton, W. Va.

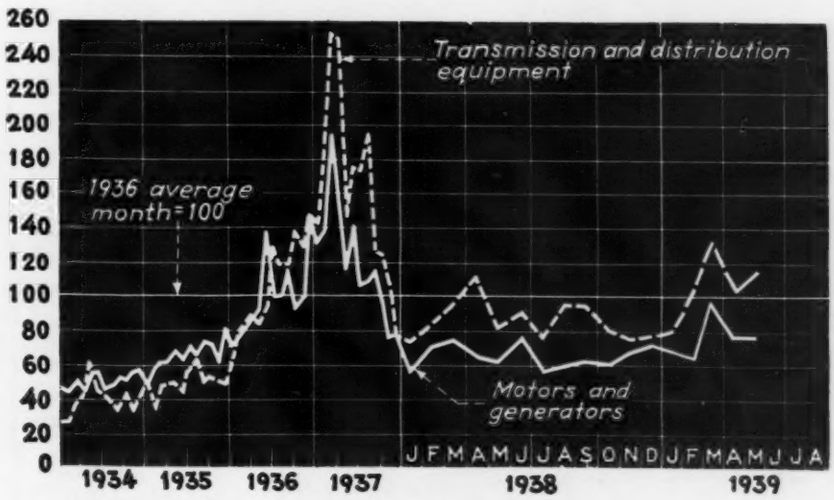
The order includes four mill motors with a combined power output of 5,000 hp., a 300-hp. reel motor, a 5,000-kw. main motor-generator set and a 650-kw. auxiliary motor-generator set. Delivery of the equipment will be completed before the end of the year.

## T & D Orders Rise, NEMA Index Shows

Orders for transmission and distribution equipment in May were 13.8 per cent greater in value than in April, according to the NEMA index, while orders for motors and generators were 1.2 per cent less than in the preceding month. The index for the former rose 14.2 points to 117.2, which was the highest figure in a year and a half, with the exception of March, 1939.

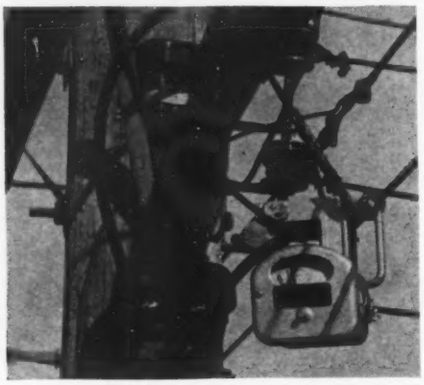
The index for motors and generators dropped 0.9 point to 76.6. This was higher than in any month of 1938 and was exceeded this year only in March and April. The change from April in other years, beginning with 1934, was successively +23.6, +9.5, +7.9, —28.6 and —6.2 per cent. Corresponding changes in the transmission and distribution group were +46.9, +2.6, —4.3, —41.2 and —26.7 per cent.

| | Motors and Generators | | Transmission and Distribution | |
|---|---|---|---|---|
| Month | 1939 | 1938 | 1939 | 1938 |
| January | 69.2 | 57.4 | 81.0 | 70.2 |
| February | 67.8 | 70.8 | 108.3 | 79.3 |
| March | 99.3 | 74.7 | 129.1 | 91.4 |
| April | 77.5 | 66.6 | 103.0 | 105.4 |
| May | 76.6 | 62.5 | 117.2 | 77.3 |




**N.E.M.A. Index of orders received for motors and generators and for transmission and distribution equipment**

A MOST DEPENDABLE AND MONEY-SAVING METHOD OF CHECKING TRANSFORMER LOADING



MAX-I-METER installed at end of transformer secondary terminal.

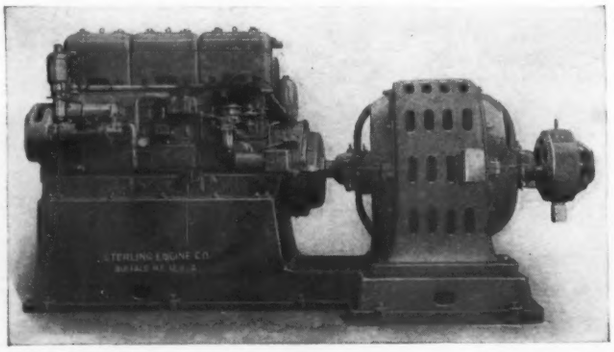
THE simple way for you to get all of the facts on the economic value of the MAX-I-METER to your inspection and maintenance staff, and on its accuracy, is to try a MAX-I-METER. They are inexpensive and soon pay for themselves. Order one today—get your own proof.

**H D ELECTRIC COMPANY**
**100 W. Monroe St. Chicago, Ill.**

# H D MAX-I-METER

## THE STANDARD OF EXCELLENCE IS UPHELD BY INFORMED ENGINEERS!

**Guntersville Dam, T.V.A. emergency generator set, (Electric Machinery and Manufacturing Company Generator), driven by a Sterling Viking 6-cylinder engine rated 425 H.P. 1200 R.P.M. Engine officially government tested 12 hours, loaded 300 K.V.A. at unity power factor; produced far in excess its rated horsepower without employing the correction factor.**



STERLING HIGH DUTY

Sterling

INTERNAL COMBUSTION ENGINES

**A Standard, set up in specifications, secures better built products. The Sterling Viking Engines are full load stationary engines. Witness the performance! Engines consist of more than rated horsepower and price.**

**Engineers secure for their clients and for their government properly designed and built equipment by specifying it.**

## STERLING ENGINE COMPANY

*Home Office and Plant,*
1270 Niagara Street,
Buffalo, New York.

Dept. C-2

*Branch Office,*
900 Chrysler Bldg.,
New York, N. Y.


## Boulder Dam Awards Total $2,136,072

Contracts totaling $2,136,072 for power machinery for the Boulder Dam power house have been awarded by Secretary Ickes.

Baldwin-Southwark Corp. of Eddystone, Pa., was awarded an $874,000 contract to furnish two 115,000-hp. turbines. Railway & Industrial Engineering Co. of Greensburg, Pa., was awarded a $371,000 contract for two 23,000-volt bus structures. Allis-Chalmers Manufacturing Co. was awarded a $564,509 contract to furnish five 23,000-volt oil circuit breakers.

Westinghouse Electric & Manufacturing Co. was awarded a $13,463 contract to furnish two 15,000-volt oil circuit breakers.

Equipment for changing and extending existing 23,000-volt bus structures will be furnished by the I.T.E. Circuit Breaker Co. on a bid of $46,640, and will furnish similar equipment for changing and extending the 23,000-volt bus structures in the oil circuit breaker rooms for $166,330.

Allis-Chalmers Manufacturing Co. on a bid of $99,230 will supply equipment for separating tie buses and providing independent terminals on eight existing 23,000-volt oil circuit breakers.

•

## Vote 20-Cent Dividend

Knapp-Monarch Co. has declared a dividend of 20 cents a common share, payable August 15 to stock of record August 1. Sales for the first six months totaled $1,455,514, against $1,531,139 in the same 1938 period.

•

## To Launch Campaign

Heralded by the slogan "It's Easy to Stay Young Electrically," General Electric Co. will launch in October the most ambitious and complete nation-wide advertising program in behalf of its full line of home appliances that has ever been contemplated by the company, it was announced by C. H. Lang, general advertising manager. Emphasis in all copy will be on the personal services which electricity provides.

### New York Metal Prices

| | Aug. 8, 1939 Cents per Pound | Aug. 2, 1939 Cents per Pound |
|---|---|---|
| Copper electrolytic | 10.50* | 10.375* |
| Lead Am. S. & R. price | 5.05 | 4.95 |
| Antimony | 12.00 | 12.00 |
| Nickel Ingot | 35.00 | 35.00 |
| Zinc, Spot | 5.14 | 4.99 |
| Tin, Straits | 48.80 | 48.45 |
| Aluminum, 99 per cent. | 20.00 | 20.00 |

* Delivered Connecticut Valley.

# Field Reports on Business

*Electrical business continues to show improvement, with manufacturers reporting increased earnings. The general tone of the electric market is encouraging. Power production shows signs of further expansion, which may necessitate additional capacity for the utilities. Appliance sales continue upward.*

## NEW YORK

A rise in demand for power-generating equipment over the next few months is seen as a result of the continued rise in power production and the curtailing of government competition. When Congress killed the Administration's large spending-lending program business was given an incentive to go ahead with private expansion, in the opinion of economists. The lessening of municipal ownership has encouraged utilities to go ahead with long-delayed rehabilitation programs.

Electrical manufacturers stand to gain a large amount of business from the government's shipbuilding program. Expectations are that the troubled conditions in Europe will force foreign buying of American electrical equipment. Several orders are in prospect.

Industrial demand for electrical equipment is expected to show substantial improvement in coming weeks as plants begin to plan fall production. Many feel that trade in the fall will be well above present levels. There is a renewed confidence in the general business outlook.

Sales of household electrical appliances continue to dominate the market as utilities and retail outlets push their campaigns. This fall will see sales drives pushed on even bigger scales than the spring and summer campaigns.

Retail merchants estimate that department and specialty stores will show a rise of 6 to 8 per cent in sales during the fall months. Building activity in this area continues at a fair clip.

## NEW ENGLAND

The general tone of the electrical market is decidedly encouraging and a good deal of optimism prevails over the prospects for continuance of the present steady trend into the autumn. Small motors are in good demand; heavy electrical machinery, on the other hand, is attracting less interest, though three small turbo-generator units aggregating approximately 2,000 kw. will be bought shortly for a new industrial plant being constructed on the waterfront at Quincy, Mass.

In downtown Boston renovation of stores is proceeding at a good rate; illuminated signs recently erected include a large flashing type, 64 x 35 ft., using 560 15-watt lamps and utilizing 18.5 kw. in energy. Commercial cooking installations are increasing throughout this area. Included in recent sales of heavier appliances are complete electric kitchen installations in a Providence college aggregating 125 kw., furnished by the Edison Electrical Appliance Co.

Employment has increased at Pittsfield, Mass., due to improved business conditions at the local G.E. plant. A shortage of skilled workers in plastics is noted. In the Boston metropolitan area nine new manufacturing companies have commenced operations during the past month. Since the beginning of the year more than 55 new firms have located in this area, adding 1,600 employees to the rolls. Merchandising throughout New England is keeping pace with last year. Refrigerator sales are advancing into a commanding position; notably stronger than last year are widening demands for water heaters.

## PACIFIC COAST

Electrical business in the Western states continues in a state of rather unstable equilibrium between pessimism and optimism, as seems to be characteristic of 1939. However, the whole aspect is encouraging, despite occasional price flurries on a few leading staples. Because stocks are in good shape and collections very fair, manufacturers' prices changes are now definitely advanced.

Recent actual and prospective orders include 172,000 ft. single 600-volt paper and lead cable, largely No. 1/0 and 500,000 circ.mil, and 40,000 ft. three-conductor, 5,000-volt cable, chiefly 500,000 circ.mil, for Los Angeles; five electric bridge cranes for Mare Island Navy yard; a $308,466 award for No. 3 power plant on All-American Canal near Calexico in Imperial Valley, a projected $400,000 power plant for Pearl Harbor, five lightning arresters for Los Angeles, ranging from 115,000 to 287,500 volts, pole contracts for Burbank and Bonneville, the latter totaling $36,690, and bids averaging $46,000 for control equipment, switchgear and circuit breakers for the Elephant Butte project in New Mexico.

Sales of lighting material are especially active, wholesalers reporting that close to 40 per cent of their orders cover lighting equipment for new structures and particularly redesigned office buildings; 75 to 1,000-watt units are now being specified for schools, and "downtown" organizations in various cities are sponsoring such modernization efforts.

## CHICAGO

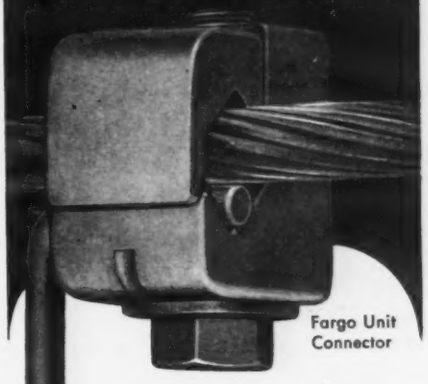
The outlook for fall business appeared highly satisfactory. Retail trade registered moderate gains over the previous week, while wholesale orders increased as high as 30 per cent over the corresponding period in 1938.

Industrial activity continued to forge ahead, steel output particularly making sharp advances. Residential construction during July declined slightly from the previous month, but remained far ahead of a year ago. Work on a large apartment housing project involving an expenditure of $6,934,000 will start immediately. A new box manufacturing company will spend $50,000 for plant equipment. The Eastman Kodak Co. will spend $500,000 for a plant addition.

Lighting equipment sales are encouraging, with fluorescent and outdoor units moving especially well. One installation included 51 100-watt fluorescent lamps, while another order called for 36 1,500-watt floodlights.

REA has allotted $75,000 for the construction of a generating plant at Elizabeth, Ill. Contracts recently awarded by the REA include $1,800,000 for 1914 miles of line to be constructed in Illinois.


Connect With
FARGO
When You TAP or SPLICE the line




● RE-USE the same FARGO UNIT CONNECTOR year after year . . . it still "grips like a vise". One-piece construction . . . nothing to lose...saves time and trouble.

● SPLICE your line with the FARGO LINE SPLICE and it *stays* spliced. Even burred end wires can't slip inside the Fargo 4-jaw gripping unit with "Safety Zone" feature. Write to South Milwaukee, Wis., for connector information.

DISTRIBUTED BY
LINE MATERIAL CO.

# NEWS ABOUT PEOPLE

## Vladimir Karapetoff Retires from Cornell

Vladimir Karapetoff, professor of electrical engineering at Cornell University, has retired after 35 years of service. Although he is considerably below the retirement age, Dr. Karapetoff has been made professor emeritus by the university trustees in view of his long and distinguished service.

His present address is Romaine Place, Leonia, N. J., where he is actively engaged in research and consulting work. During the academic year 1939-40 he has been invited to give a course of lectures on electromagnetic waves in the new evening post-graduate course for engineers at Stevens Institute of Technology, Hoboken, N. J.

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▶ FRANK M. LYNCH, tax supervisor and an assistant controller of Niagara Hudson Power Corp., has been elected an assistant treasurer by the board of directors.

▶ ALLAN D. COLVIN, executive vice-president of the Connecticut Power Co., has been appointed a member of the Groton-New London bridge commission by Gov. Raymond Baldwin.

▶ JAMES E. SPECHT has been appointed to succeed the late A. D. Webster, superintendent of the Orrville, Ohio, municipal utilities, who died recently. He is a graduate in engineering of the University of Minnesota.

▶ WILLIAM O. LIPPMAN has been appointed works manager of the East Springfield, Mass., works of the Westinghouse Electric & Manufacturing Co. Mr. Lippman has been associated with Westinghouse since 1918.

▶ T. J. FLEISCHER of Philadelphia has been appointed general sales manager of the electrical manufacturing division of the Walker Electrical Co. of Atlanta, Ga. Mr. Fleischer has been connected for a number of years with the Crouse-Hinds Co. He is well known in the South, having traveled in that section extensively.

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## H. L. Durgin Heads Vermont Association

Harold L. Durgin, chief engineer of the Central Vermont Public Service Corp. and of the Twin State Gas & Electric Co. property in Vermont, with headquarters at Rutland, has been

elected president of the Vermont Electrical Association.

For two years after being graduated from the University of Maine Mr. Durgin was operator in various substations at Augusta, Bath, Lewiston and Shawmut for the Central Maine Power Co. He then spent three years on the staff of Chief Engineer Frank H. Mason of the New England Public Service Co., Augusta, in designing and field supervision of substation construction and the equipment of hydro-electric generating plants.

For five years he was electrical engineer for the Central Vermont and Twin State companies with headquarters at the then Boston offices, becoming chief engineer in 1934.

## Graybar Announces Department Changes

Graybar Electric Company has announced several changes in its general sales department following a realignment of assignments:

E. A. Hawkins becomes general sales manager, G. F. Hessler assistant general sales manager, D. C. Guest sales manager outside construction department, L. W. Taylor assistant sales manager outside construction department, Chicago; J. A. Mayer supply sales manager.

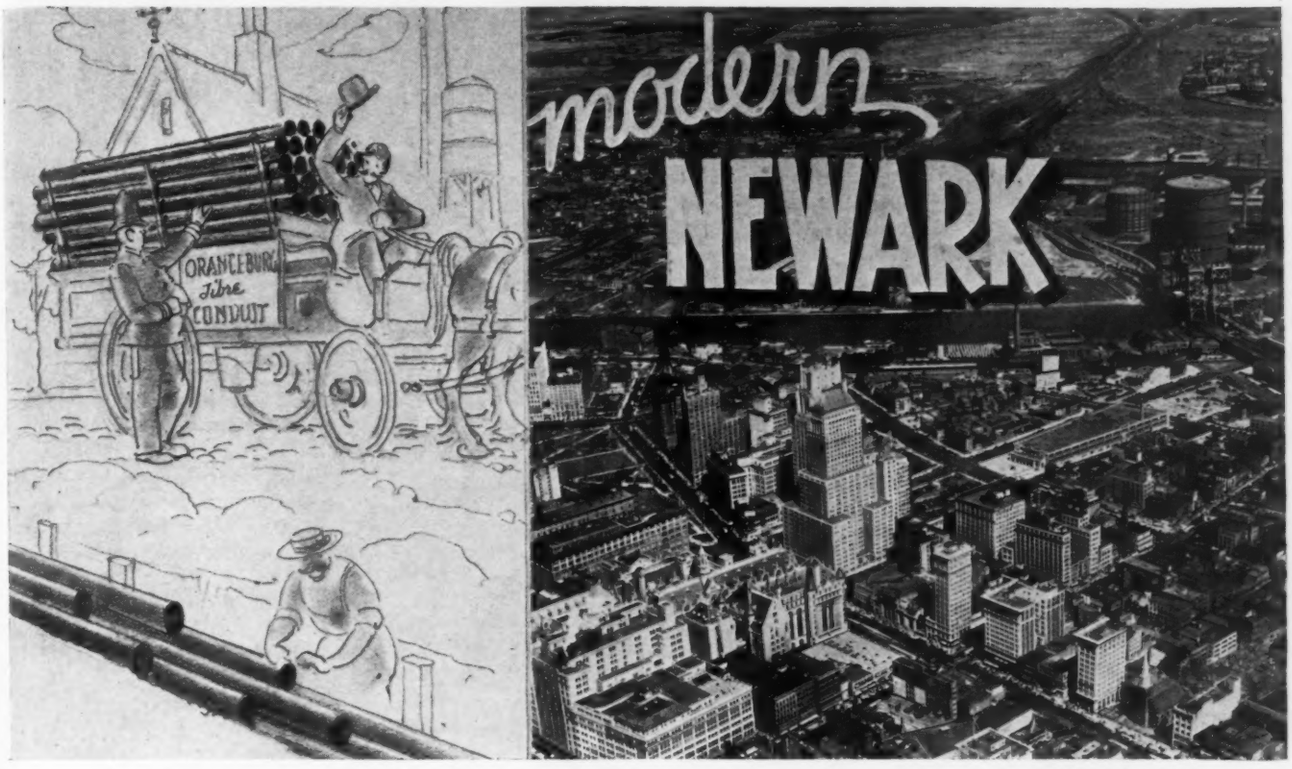
D. H. O'Brien general merchandising manager, R. C. Litchfield and G. A. Antrim assistant general merchandising managers, G. K. Heyer general telephone and power apparatus sales manager, A. J. Eaves research products sales manager, L. D. Gore sales manager hearing aids department, G. L. Donnett research products sales engineer, E. J. Dailey power apparatus sales manager, C. S. Powell telephone sales manager, J. B. Long telephone sales engineer, A. E. Hetzner signaling sales manager.

H. Metz general lamp and lighting sales manager, R. C. Kinney lighting sales manager, K. B. Hopkins advertising manager, Mildred A. Nichols director of the home economics department, J. H. Gardiner sales statistician, W. R. Wheeler traffic manager.

▶ H. M. PARKER has been elected treasurer of the Central Illinois Public Service Company and R. C. SLOAN assistant treasurer to succeed him. Both vacancies resulted from the resignation of J. C. HAPPENNY, treasurer of the utility, as announced in ELECTRICAL WORLD for August 5, 1939. Mr. Happenny resigned to assume the presidency of the Oklahoma Power & Water Company with offices at Sand Springs.

▶ RALPH W. THORNE, president of the Darling Valve Co., has been appointed to a ten-year term on the Pennsylvania Public Utility Commission. Mr. Thorne was selected by Gov. Arthur H. James to

# ORANGEBURG HAS *long* BEEN PART OF




© Fairchild Aerial Surveys, Inc.

The Newark metropolitan district served by "underground," electrically, constantly taxes the most optimistic of forehanded planning by growth exceeding all expectancies. From a "suburban center" of New York yesterday Newark today ranks as one of the Nation's leading areas in its own right.

**ORANGEBURG ENGINEERING**

Factually based on the accumulated data of yesteryear, "engineering" attempts to build not only for today, but for the requirements of tomorrow.

Engineering of Orangeburg conduits for installation underground has an unequalled foundation of 46 years of international "experience" and study.

One of the many Orangeburg "points that count"

Orangeburg, trademark, is a guarantee of the best of Fibre Conduits, a time-tested enduring "service" of cable protection *wherever electrical raceway facilities are to be installed underground.*

● Underground "conditions" vary widely in all parts of the country, indeed, on almost every project. Rarely, however, are such extremes encountered as in the Newark area where duct banks are installed in marshy ground below salt tidewater level—in ultra-corrosive cinder and refuse backfill—in the acid soaked soil of chemical industry centers— and in "rock trench" under the heaviest traffic in the country.

In the Newark area Orangeburg installations of 40 years past are in active trouble-free service today.

For installation underground WITH CONCRETE ENCASEMENT: Orangeburg STANDARD FIBRE CONDUIT is recommended for duct banks (4 ducts and over), main distribution, high tension and "downtown" locations.

For installation WITHOUT CONCRETE ENCASEMENT: Orangeburg dual-economy NOCRETE conduit is recommended for service entrances, extensions, parkways and street lighting, suburban distribution, laterals, signal systems, etc.

*Sales Agent—Distributors*

**GENERAL ELECTRIC SUPPLY CORP.**

**GRAYBAR ELECTRIC COMPANY INC.**

**MADE AT ORANGEBURG, NEW YORK
BY THE FIBRE CONDUIT COMPANY
292 MADISON AVE. NEW YORK CITY**

**ORANGEBURG** *Standard* for installation *with* concrete encasement
NOCRETE for installation *without* concrete encasement

fill the vacancy caused by the resignation of Donald M. Livingston, Philadelphia accountant.

▶ HUGH R. MCKEAN, assistant supervisor of cost for the General Electric Co. since 1933, has been appointed operating manager for the Pittsfield division of the plastics department. He will be in direct charge of engineering and manufacturing, reporting to G. H. Shill, manager of the department.

▶ WILLIAM C. VAN CLEAF has been appointed director of industrial relations of the manufacturing departments of Allis-Chalmers Co. at Milwaukee, Wis., where he will handle all matters pertaining to labor relations. In this capacity he will act as chairman of the company's labor advisory board.

▶ A. W. MCARTHUR has been appointed to the works managership of the North Woolwich Works of W. T. Henley's Telegraph Works Co., Ltd., of London, England, to succeed E. Lefeaux, who recently died. Mr. McArthur has been connected with the Henley organization since 1900.

▶ HENRY W. BURRITT has resigned as vice-president in charge of sales of the Kelvinator division of Nash-Kelvinator Corporation, to become president and general manager of Eureka Vacuum Cleaner Company. With Mr. Burritt taking over the presidency of Eureka, FRED WARDELL, president and founder of the company, becomes chairman of the board of the latter company.

▶ F. A. WRIGHT has been named manager of resale sales for Cutler-Hammer, Inc., in Milwaukee, Wis., to succeed B. M. Horter, recently appointed general sales manager. Mr. Wright has been with the company since 1927; he goes to Milwaukee from the St. Louis sales territory.

▶ C. H. MITCHELL has been appointed manager of works for the Canadian Westinghouse Co. Mr. Mitchell is in his fortieth year of service in Westinghouse interests. L. F. MERRICK was appointed assistant manager of works. He has been connected with the company since 1925. J. T. TIPLADY, who has been connected with Westinghouse interests for 31 years, has been appointed to the position of general superintendent. Both Mr. Mitchell and Mr. Tiplady have served in the British Westinghouse Co. in England, as well as the Westinghouse Electric & Manufacturing Co. in the United States. F. S. STRICKLAND has been promoted to the position of superintendent, electrical department, having been in the service of the company for 26 years.

## R. C. Cosgrove Named to New Westinghouse Post

R. C. Cosgrove, manager of the household refrigeration department of the Westinghouse Electric & Manufacturing Co., has been promoted to assistant sales manager of the merchandising division, Mansfield, Ohio.

A graduate of Carnegie Institute of Technology, Mr. Cosgrove has spent his entire 20-year business career with Westinghouse. He has been manager of the household refrigeration department for several years; his new position is one created by his appointment.

R. C. Cosgrove

T. J. Newcomb, now head of the commercial refrigeration department, succeeds Mr. Cosgrove. Commercial refrigeration activities will be merged with the air-conditioning department under the direction of P. Y. Danley, with headquarters at East Springfield, Mass.

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▶ ROBERT L. KAADE, formerly assistant to the division sales manager of the Northern Indiana Public Service Co., Fort Wayne, has been transferred to Plymouth, where he will be district sales manager for the utility.

▶ GUY T. SHOEMAKER, president, United Light & Power Service Co., has been nominated a manager of the American Society of Mechanical Engineers for 1940. Mr. Shoemaker is also vice-president and general manager of the United Light & Power Co. and of several of its subsidiaries.

▶ CHARLES A. LIND, fuel agent, Commonwealth Edison Co., was presented with a jeweled pin at the recent semi-annual badge distribution meeting, indicating his completion of 45 years service with the utility and marking him as the second oldest employee in point of service. At the same meeting JOHN J. DONOHUE and GEORGE J. C. HANSEN, construction department, received 40-year decorations.

## OBITUARY

▶ FREDERICK THOMAS KAELIN, consulting engineer for the Shawingan Water & Power Co., died at his home in Montreal on July 27, at the age of 65. Born in Switzerland, Mr. Kaelin began his career with the Brown, Boveri Co., coming to Canada in 1905 as draftsman for the Shawinigan Water & Power Co. He was chief engineer for the utility from 1919 to 1930. In 1920 he invented the electric boiler bearing his name, which has been used in hydro-electric generation in Quebec and Ontario and also in the pump and paper industry. Mr. Kaelin was a member of the American Institute of Electrical Engineers, the Engineering Institute of Canada and an associate member of the American Electro-Chemical Society.

▶ FRANCIS RUSE STARR, superintendent of distribution for the Iowa division of the Nebraska Power Co., died July 14, at the age of 66, following a heart attack. A native of Paris, Tex., Mr. Starr came to Council Bluffs in 1904 and at once became distribution foreman of the former Citizens Gas & Electric Co., remaining in that capacity for 35 years.

▶ FREDERICK KRETZ CAMERON, assistant secretary and assistant treasurer of the Phelps Dodge Corp., died at his home in Rockville Centre, L. I., at the age of 59. He had been employed by this company for 39 years.

▶ ARTHUR H. ABBOTT, 56, for many years transformer specialist of the General Electric Company's Boston office, and later head of the manufacturing sales organization in that city which bore his name, died at Winchester, Mass., on July 31. He was a native of Clinton, Mass., and was graduated from the Massachusetts Institute of Technology in 1905.

▶ RALPH M. RUMBEL, manager of the meter division of the Westinghouse Electric & Manufacturing Co., at Newark, N. J., since 1934, died July 31 at Clarion, Pa., at the age of 60. A native of Pennsylvania, Mr. Rumbel was graduated in electrical engineering from Pennsylvania State College in 1903, enrolling in the Westinghouse student course the same year. While with Westinghouse Mr. Rumbel served successively as service engineer, assistant superintendent and superintendent of service at various company offices; he became service manager in the Pittsburgh district in 1912 and was named service manager of the central district in 1928.

## REA Allots Funds; New Contracts Let

New allotments made by the Rural Electrification Administration are the first that agency has made as an Administration within the Department of Agriculture. They are also the first made during the current fiscal year, although a considerable amount of the $40,000,000 made available by Congressional appropriation for loans during this fiscal year was earmarked during the closing weeks of the 1938–39 year. Among the allotments were the following:

COLORADO—Southeast Colorado Power Assn., Lamar, E. G. Rash, supt., $152,000 to build 165 miles of line, 353 members in Otero, Crowley, Pueblo, Bent and Prowers counties.

GEORGIA—Jackson Electric Membership Corp., Jefferson, Robert J. Kelly, supt., $211,000 to build 224 miles of line, 1,084 members in Jackson, Hall, Lumpkin and Gwinnett counties.

ILLINOIS—Adams Electrical Co-operative, Quincy, Roy L. Sharrow, president, $170,000 to build 154 miles of line, 538 members in Brown and Schuyler counties. Clinton County Electric Co-operative, Inc., Breese, Fred J. Hempen, president, $284,000 to build 307 miles of line, 744 members in Clinton County.

INDIANA—Knox County REMC, Vincennes, Ernest B. Miller, president, $380,000 to build 401 miles of line, 1,390 members in Sullivan, Knox, Gibson, Pike and Posey counties.

IOWA—T.I.P. Rural Electric Co-operative, Brooklyn, Irving L. Nervig, supt., $243,500 to build 287 miles of line, 720 members in Tama, Poweshiek and Iowa counties. Woodbury County Rural Electric Co-operative Assn., Moville, Dale Schriener, supt., $100,000 to build 100 miles of line, 256 members in Woodbury County. Farmer's Electric Co-operative, Inc., Greenfield, Albert Ray, president, $197,000 to build 195 miles of line, 521 members in Adair, Adams and Guthrie counties.

MINNESOTA—Freeborn-Mower Co-operative Light and Power Assn., Albert Lea, Lewis Brown, supt., $283,000 to build 301 miles of line, 680 members in Freeborn, Mower and Dodge counties. Wright-Hennepin Co-operative Electric Assn., Maple Lake, Edward R. Slebiska, supt., $142,000 to build 136 miles of line, 393 members in Wright, Hennepin and Carver counties.

MISSISSIPPI — Southern Pine Electric Power Assn., Taylorsville, S. D. Russell, president, $189,000 to build 235 miles of line, 985 members in Jeff Davis, Copiah, Covington, Rankin, Lawrence, Clarke, Forrest, Jasper, Scott, Smith and Newton counties.

MISSOURI—Osage Valley Electric Co-operative Assn., Butler, E. C. Westhoff, supt., $109,000 to build 115 miles of line, 374 members in Bates, Henry, St. Clair and Vernon counties.

PENNSYLVANIA — Southwest Central Rural Electric Co-operative, Indiana, Pa., Sterling J. Orange, supt., $122,000 to build 110 miles of line, 360 members in Indiana, Armstrong, and Cambria counties. Central Electric Co-operative, Inc., Parkers Landing, D. E. Edge, supt., $360,000 to build 262 miles of line, 1,145 members in Armstrong, Butler, Clarion, Venango and Forest counties. Valley Rural Electric Co-operative, Inc., Martinsburg, John H. Gahagen, president, $149,000 to build 148

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OUR 66TH YEAR

miles of line, 536 members in Blair, Bedford, and Huntingdon counties.

SOUTH CAROLINA—Aiken County Electric Co-operative Assn., Aiken, T. W. Henderson, supt., $130,000 to build 172 miles of line, 519 members in Aiken, Orangeburg, Calhoun, Lexington, Barnwell, Edgefield, and McCormick counties.

SOUTH DAKOTA—West River Electric Assn., Wall, F. H. Rector, president, $143,000 to build 125 miles of line, 445 members in Pennington County.

TEXAS—Comanche County Electric Co-operative Assn., Comanche, Arthur C. Thomas, supt., $157,000 to build 218 miles of line, 497 members in Comanche and Eastland counties.

WASHINGTON—Benton Rural Electric Assn., Prosser, J. B. Whitehead, supt., $104,000 to build 92 miles of line, 308 members in Yakima County.

Construction contracts:

Delaware Rural Electric Assn., Greenwood, Del., A. G. Ingram, supt., and Gibbs & Hill, Engineer, New York, contract to Miller-Baxter Co., Inc., Indianapolis, another section of project, 302 miles of line, 823 members; bid $208,354.

Western Illinois Electrical Co-operative, Carthage, Ill., Leslie C. Marvel, supt., and R. A. Donahue, Macomb, Ill., engineer, contract to C. R. Cento, Decatur, entire project, 371 miles of line, 800 members; bid $248,063.

Southeastern Illinois Electric Co-operative, Inc., Harrisburg, Ill., A. F. Lentz, supt., and Laramore and Douglas, engineer, Chicago, contract to Andrews Asphalt Paving Co., Hamilton, Ohio, entire project, 758 miles of line, 1,627 members; bid $435,791.

Flint Hill Rural Electric Co-operative Assn., Inc., Council Grove, Kans., T. T. Parker, supt., and Paulette and Wilson, Topeka, engineer, contract to Inland Construction Co., Omaha, Neb., and one to Smith Brothers Construction Corp., Kansas City, Mo., for building parts 1 and 2 of the project, 558 miles of line, 1,050 members; bid $366,125.

Macon Electric Co-operative, Macon, Mo., P. V. Walker, supt., and Baumes Engineering Co., St. Louis, Mo., engineer, contract to R. B. Potashnick, Cape Girardeau, entire project, 572 miles of line, 1212 members; bid $368,106.

Coleman County Electric Co-operative, Inc., Coleman, Tex., S. R. Hale, supt., and William G. Morrison, Waco, Tex., and Clifford Thompson, engineers, contract to the Walco Engineering & Construction Co., Tulsa, Okla., two sections of project, 398 miles of line, 790 members; bid $213,924.

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## Utility Lighting Program Planned by Westinghouse

A new year-around program to develop lighting business for electric utilities is being inaugurated this month by the Westinghouse lamp division, according to H. E. Plishker, director of advertising and sales promotion.

Three loose-leaf portfolios cover the various phases of home, farm, industrial and commercial lighting. Promotional material, advertising and direct-mail campaigns, booklets, leaflets and dealer helps are included. Further promotion pieces from time to time will supplement the portfolio.

## Recent Rate Changes

PUBLIC SERVICE CO. OF INDIANA has filed schedules with the Public Service Commission for a voluntary reduction in electric rates estimated to save about 144,000 residential and commercial customers in central and southern Indiana more than $170,000 annually. New rate schedules, which would be effective September 1, call for a reduction of ½ cent per kw.-hr. in the initial step of the rate and a similar reduction in the second step. Number of kw.-hr. in each of these two steps would be changed from 30 to 35. In cities classified as Class A, the first step would be lowered from 6½ cents to 6 cents per kw.-hr.; in Class B cities, from 7 to 6½ cents. New rate for second step in all schedules would be 4 cents. NORTHERN INDIANA POWER CO. has filed similar schedules which would effect an estimated $66,000 reduction in electric rates to its 60,000 urban and rural residential and commercial customers in central and western Indiana.

WHEELING ELECTRIC CO. has been granted authority by the West Virginia Public Service Commission to institute reduced rates, on bills rendered as of August 15, estimated to save commercial and industrial customers $75,000 annually.

NEW YORK PUBLIC SERVICE COMMISSION has ordered Central New York Power Corp. to reduce electric rates by $450,000 annually in territory served by former Syracuse Lighting Co., effective September 1. Territory includes Syracuse and Cortland and number of villages and towns in Onondaga, Cortland, Oswego and Madison counties. Reduction means a decrease of about 7½ per cent in the customers' bills.

UNION LIGHT, HEAT & POWER CO. of Cincinnati has filed a schedule with the Kentucky Public Service Commission for a reduction in commercial and industrial rates in eight northern Kentucky communities, estimated to be more than $50,000 a year. New schedule would mean a saving of about 8 per cent to small commercial and power customers and about 5 per cent to larger commercial and power users.

UNION LIGHT & POWER CO. has received permission from the Massachusetts Public Utilities Commission for a rate reduction, effective August 1, to provide an annual saving of about $13,000.

ILLINOIS COMMERCE COMMISSION has announced that estimated annual savings to public utility customers in Illinois as a result of annual electric rate reductions during the fiscal year ended June 30, 1939, totaled $2,887,200.

GRAND HAVEN, MICH., municipal plant recently put into effect a rate reduction which will mean about $20,000 a year savings to its customers, according to J. B. Sims, superintendent. The plant also gave its customers a free month's bill—in effect, an 8½ per cent retroactive rate reduction on 1938 business.

WELLINGTON, OHIO, municipal plant has announced a reduction in electric rates to average 10 per cent on bills of consumers using more than 25 kw.-hr. a month. New rate is expected to save the 800 customers between $6,000 and $10,000 a year and replaces one in effect since 1936.

NEW YORK PUBLIC SERVICE COMMISSION has approved schedules calling for general reductions in electric rates by three northwestern New York municipal electric plants. Village of Fairport asked for revised rates to provide an estimated savings of about $3,500 annually; Frankfort, rates for an estimated savings of about $2,100 annually and Churchville, rate reductions totaling $1,180 annually.

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## Municipal Plants

PATTONSBURG, MO.—Missouri Power & Light Co. has asked the Public Service Commission for an order authorizing it to cease operating as an electric utility in this city. Franchise of the utility, operating here since 1914, expired in 1934. Pattonsburg, on a bond issue and federal grant aggregating $67,500, built and is operating a municipal electric plant.

BOONVILLE, IND.—Southern Indiana Gas & Electric Co. lost an appeal to the Indiana Supreme Court from an interlocutory order in condemnation and for naming appraisers to appraise its property in this city. The high court held the Indiana utility law is patterned after the Wisconsin law and that the 1933 utility act providing for purchase and condemnation of utility property by municipal units is not coercive and does not take property without due process of law.

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## Westinghouse Men Cited for Accident-Free Work

For having supervised the work of several thousand employees who have attained a total of more than 7,168,000 man-hours of accident-free work in two plants during the last five years, representatives of five departments of the Westinghouse Electric & Manufacturing Co.'s lamp division were honored recently by certificates of merit presented by the Newark, N. J., Safety Council.

Those who received the council citations were: J. B. Whitmore, superintendent lamp division's base plant at Belleville; Dr. A. M. Hageman, manager lamp engineering department and laboratories; C. V. Iredell, superintendent of wire products division; O. R. Wollentin, superintendent equipment and development, and F. C. Thoms, superintendent of lamp manufacturing.

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## Interlocking Hearing Set

FPC has ordered that a public hearing be held on September 6 on the application of Charles M. Tenney for authorization to hold certain interlocking positions at which the applicant is required to make further showing that neither public nor private interests will be adversely affected by reason of his holding of positions within the purview of Section 305 (b) of the Federal Power Act. Mr. Tenney has applied for authorization to hold the positions of director in the Rockland Light & Power Co., Rockland Electric Co. and Fitchburg Gas & Electric Light Co.

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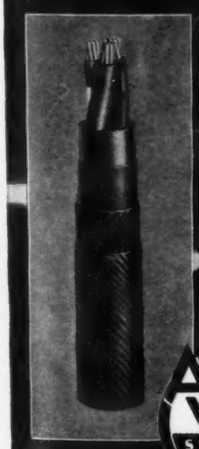

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NO ducts, conduits or other external protection are required when installing these Parkway Cables. They may be laid in an ordinary plowed furrow or hand cut trench, and give lasting service at lowest possible cost.

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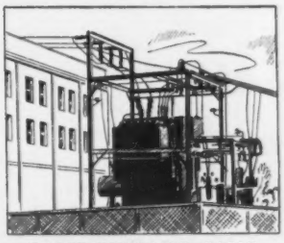

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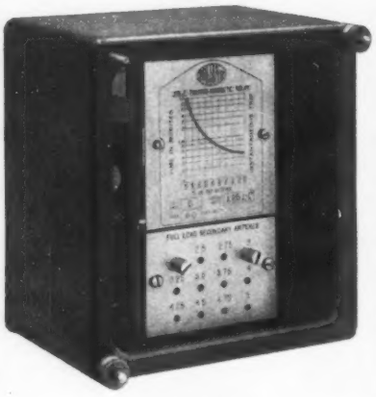

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*Sales Agencies in Principal Cities in U.S.A. and Canada*


## Carrier Attenuation Discloses Glaze Formation

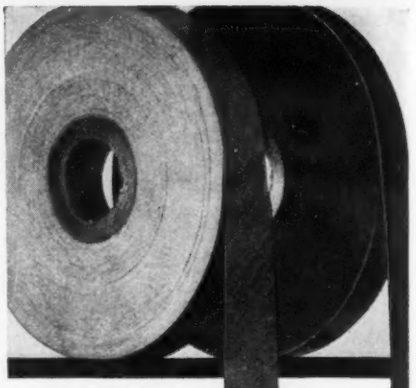
[*Continued from page 40*]

quickly as possible in order to avoid burndowns of the conductors. For example, if it is definitely known that a small amount of ice exists on the conductor, that the temperature is rising rapidly and that little or no wind is present, it is probably reasonable to assume that the melting of the ice by applying short-circuit current is unnecessary. However, if ice is forming and the temperature conditions are such that it would probably continue to form, and if wind of any magnitude exists or is predicted, all possible steps should be taken to melt the conductor glaze at the earliest possible moment.

During this experimental work, detailed records were kept of sleet detector readings and weather conditions, and in each case graphic records were later prepared. This was done both in cases where the conductor glaze was melted and in cases where, due to changed weather conditions, it was not necessary to melt the ice. In Fig. 4 a typical record is reproduced. In this case the sleet detector indicated conductor glaze on the 65-mile Twin Branch-Fort Wayne line. At this time rain was falling both at Twin Branch and Fort Wayne, but based on the detector reading the sleet melt was started and the wisdom of action was later verified by visual inspection, which showed conductor glaze on the section of the line between Elkhart and Ligonier.

In another case the detector indicated late one night that ice was forming at a point between Fort Wayne and Marion, and although there was some hesitancy about applying short-circuit current, based on the detector readings, it was finally decided to do so. The following morning visual inspections were made by patrolmen and it was noted that from $\frac{1}{2}$ to $\frac{3}{4}$ in. of ice still remained on the ground wire near the middle section of the line, but the conductors were entirely clear of glaze.

Heavy frost has also been found to give indications of the same order of magnitude as sleet, but its presence was recognized by the fact that weather conditions were outside of the range productive of sleet. In no case did the detector fail to in-

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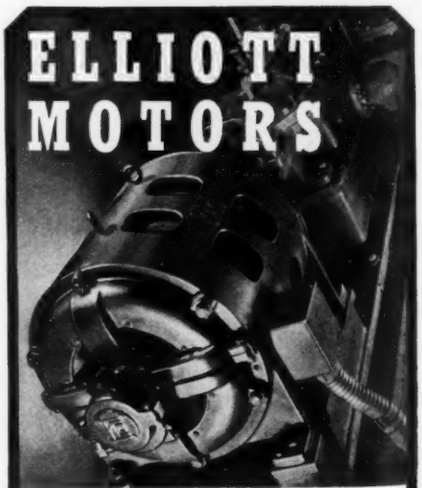

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dicate the presence of sleet on a line, and it is therefore felt that the indication of such non-hazardous conditions as frost is on the safe side and is not a serious disadvantage.

In summary, while it is felt that the use of carrier-current waves for sleet detection is still in its infancy, it is believed that this method gives a direct means for detecting the presence of sleet, snow or frost on transmission lines, even though present only in small amounts or on a small portion of the line, and that the detector readings, when properly interpreted, taking weather conditions into consideration, give the operator a more reliable guide for determining when conductor glaze should be melted than he has heretofore had. Further, it is believed that this method will eliminate the necessity of visual inspection for determining the presence of sleet on transmission lines, although it should not be inferred that visual observations are not useful.

While in no instance did the detectors fail to indicate the presence of sleet on the transmission lines, experience has shown that in general sleet detector readings taken when conductor glaze is present will be different for each line. It is, therefore, necessary to accumulate experience through actual line inspections and correlate and analyze these inspections with detector readings taken under varying glaze conditions before detector readings on a given line can be utilized to the greatest advantage. For this reason additional operating experience will be required to determine definitely the full possibilities as well as the limitations of the detector and to serve as a guide for the most satisfactory design characteristics.

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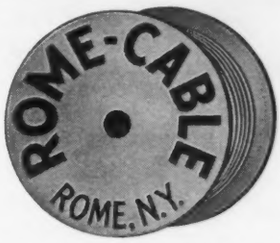
## Amortization Authorized

FPC has granted the application of the Gulf States Utilities Co., pursuant to the provisions of Paragraph E of Balance Sheet Instruction 6 of the commission's Uniform System of Accounts, for permission to amortize, over a period not exceeding twelve years, the balance of the unamortized expense and sale premium and the redemption premium on the company's first mortgage and refunding bonds, series C, 4 per cent, to be retired. The principal amount of the bonds to be redeemed is $27,300,000.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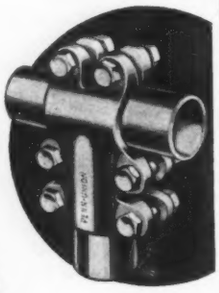

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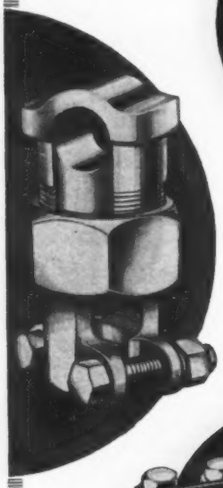

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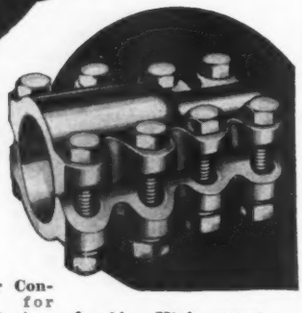

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## Capacitors Ease Peak on Municipal System

[*Continued from page 42*]

ther reduction in transformer and secondary copper losses is being made by improved power factor in the secondary circuits. Actual voltage readings at the substation at this plant before the installation of capacitors showed 2,200 volts at 865 kw. load. After the installation of capacitors the voltage read 2,270 volts with a load of 1,760 kw. In both cases the power station bus was held at 2,370 volts.

Altogether this capacitor installation has proved highly satisfactory to the city of Decatur and to the customers. It is a concrete example of what can be done in releasing generator and feeder capacity with the use of capacitors.

## Commercial Water Heating Application Engineering

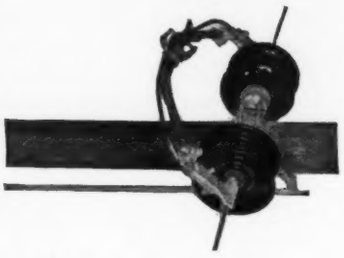
[*Continued from page 48*]

3 shows a wiring diagram of connecto protect the control circuit. Fig. 4 shows a wiring diagram of connections on the rear of the panel.

The contact equipped water meter should be placed in the cold water line to the storage tank at a point where the contact leads can be connected to the test panel. The supply leads should then be connected to the source of supply or water heater switch, depending on type of test. The contact leads to the water meter consist of a three-wire flexible cable having two white wires and one red wire with a polarity plug at one end. The supply leads consist of a three-wire flexible cable having one red wire, one black and one white wire. The white and black wires are in a series with one side of the 220-volt supply to the electric heater with current flow into the white wire through test panel and out on the black wire into the main circuit. The red wire connects to the other side of the 220-volt circuit. When the single-pole switch (a) on the front of panel is closed, multiply demand chart reading by 0.5 to obtain the water demand in gallons/hour. When switch (a) is open the readings are as recorded. Opening the double-pole switch (b) clears the contacts and demand meter only. The chart best suited for this test is a circular wax coated type C, No. 112 G, 7-day chart.


K-P-F

**Pole Top High Tension Switches**



A K-P-F switch merely consists of two deadends with a rigid jumper containing a contact so arranged that it can be opened and closed. This constitutes the NECESSARY and SUFFICIENT parts of a disconnecting switch.

K-P-F ELECTRIC CO.

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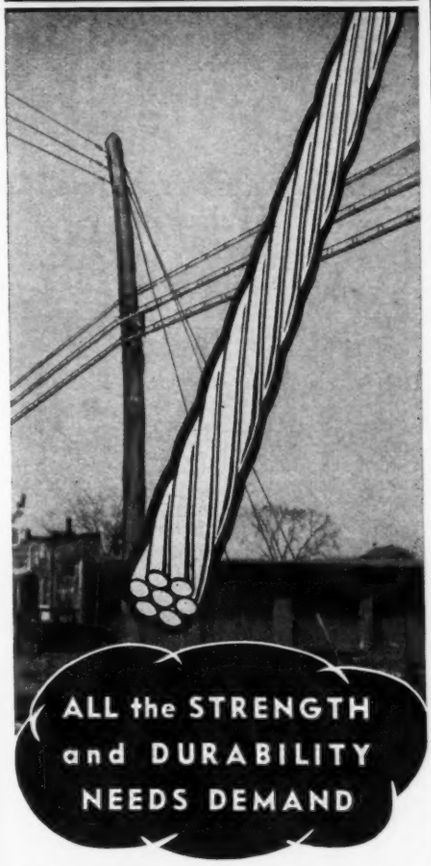
POWER TO HOLD

# Crapo
GALVANIZED STEEL
## STRAND
Guy and Messenger



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The superior tensile strength that only steel can give . . . . the ruggedness to withstand severe punishment . . . . the ability to outlast normal needs . . . All these are combined—with outstanding economy—in *Crapo* Galvanized Guy and Messenger Strand.

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*Crapo* Galvanized Steel Strand is readily available in all standard grades and sizes from representative jobbers.

*Crapo* Galvanized Products also include *Crapo* HTC-130 and HTC-80 Steel Conductors (Solid and Stranded 3-Wire), Construction Wire, Tie Wire and Ground Wire.

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA


## Machine Shave, Sterilize Sapwood

[*Continued from page 44*]

ing knife removes a greater thickness of sapwood than the trailing knife, which takes a thin shave and leaves a smooth-finished surface. The shavings are removed longitudinally, thus avoiding any cross grain cutting. Average time for shaving 35–60-ft. poles is about six minutes.

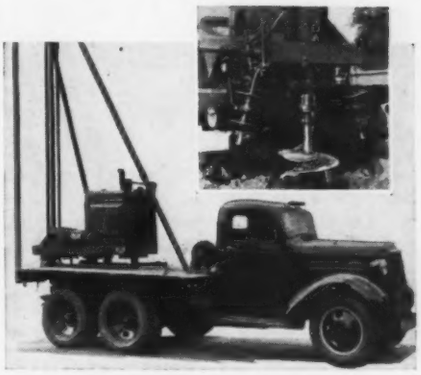
By means of this machine it is possible to shave the pole throughout its entire length or only that part in the above-ground area, depending upon the specifications of the purchaser. In those cases where only the above-ground portion is shaved the ground line area is prepared for the incising machine in the usual manner. Unlike the hand-shaved pole, where the knots were removed with a hand-axe, this machine shaves the knots as smoothly as the remainder of the pole and no ragged pockets are left to retain moisture. All surface blemishes, either natural or those acquired in handling, are removed. In addition, if there is any decay in the sapwood at the time of processing which cannot be detected from visual inspection it is exposed by the shaving machine process. We have made it a practice to inspect our poles at the point of processing during the spring and fall seasons.

After leaving the shaving machine, poles are incised, bored and gained. They are then placed in a horizontal position in an open treating tank, anchored and submerged in hot creosote at 170 to 180 deg. F. for ten to fifteen minutes. The creosote is then withdrawn from the tank. The poles are then removed and put in a vertical position in the open treating tanks for butt treatment. No change has been made in the method or time of butt treatment, but by this double treatment a better ground-line penetration has been obtained.

The creosote used for full-length treatment is of the same grade as that used for butt treatment, but is kept free of sediment, which would detract from the appearance of the full-length creosote-dipped pole.

Based on experience and conclusive proof as to the definite relationship between initial sapwood thickness and susceptibility to sap-rot, it would appear that this innovation in the processing of Western red cedar poles is a step in the right direction.


## Lower Pole Hole Costs with a—



*Close-up of drilling mechanism, and truck mounted unit with pole setting derrick in place.*

# BUDA-HUBRON
## *Pole Hole Drill!*

- Truck, trailer or tractor mounted.
- Sets all standard length poles.
- Drills holes up to 42 in. diameter and to 50 ft. in depth.

HERE is complete versatility in a pole hole digger. It permits the maximum in flexibility from the standpoint of mobility. Adjustments care for every possible condition. Drill head of exceptionally heavy design. Gears are enclosed and run in oil. Various types of winches and derricks are available. Buda-Hubron earth drills are used extensively in 41 out of 48 states, in Canada, and in 13 foreign countries. Long service abroad as well as in the United States has proved its absolute dependability.

*Send for Bulletin No. 868-W*

**Cash in on R.E.A. Work—Rent a Buda-Hubron Earth Drill—Write for details of rental program.**

### BUDA JACKS

The Buda Company has been building quality Jacks for over 30 years, and has available a wide range of sizes of cable reel, pole pulling, automatic lowering, hydraulic, journal and screw Jacks, in capacities from 1½ to 100 tons.

*Write for Jack Bulletin No. 946-W.*

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ESTABLISHED 1881
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Saves many thousands of dollars annually by elimination of tampering and theft of current. Seals all types CS meters effectively and permanently. Cannot be removed without destroying or multilating. SEND FOR SAMPLE.

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INSIST ON BLACKBURN

JASPER BLACKBURN PRODUCTS CORP.
Main and Clinton Sts. St. Louis, Mo.


## One-Minute Service on Connects and Disconnects

[*Continued from page 46*]

served. The card has visible symbols to indicate past due and uncollected bills so that this information is instantly discernible. This record carries the only signed contract with residential customers. The customer signs the card when the first connection is applied for and it remains the contract thereafter at any service location.

The customers who personally come to the office to pay their bills also set several activities in motion. Stubs from paid bills are sorted and listed by districts and balanced with cash received, and then are turned over to the bookkeeping department for posting.

### *Long Term Credit Policy*

If our customer appears at the cashier's window with a bill three days after the due date shown on the bill and protests the collection charge he is referred to the collection department. If the credit file shows the customer is not a habitually late payer the credit card is marked and the charge passed. This also applies if the customer sends in the payment by mail.

### *Adjusting Bill Complaints*

When a customer complains about a bill an adjuster talks with him, and if he is still unsatisfied the adjuster orders an investigation. An inspector calls at the home, checks the reading of the meter, the wiring for ground and the connected load. His report is returned to the adjuster, who informs the customer of the results of the investigation.

Should the customer telephone for information regarding the status of his account he is referred to a special information desk where trained clerks either answer the questions or are able to transfer the call to the proper department. If the customer calls in person a second information desk is provided for that purpose.

If the customer goes to the cashier's window and discovers the bill has been left at home a request for a duplicate is made to the customers accounts department, via pneumatic tube. There is a delay of not more than five minutes, because a request for a duplicate bill has preference over all other work. If the customer


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Lockport, N. Y.

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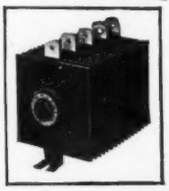
CHANGE AC TO DC



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*Send for Catalogue*

*We have been making safety tools for 24 years*

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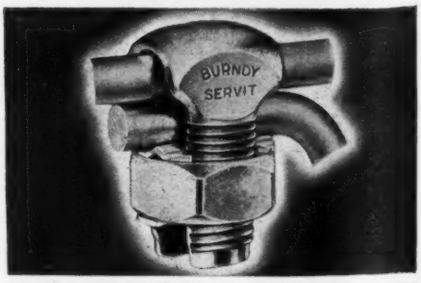
BURNDY




SERVIT

brought a pay check or a government check along to pay the bill with he is referred to the cashier's desk, where the service is efficient and courteous.

Finally, if our customer is a newcomer to Kansas City and a new customer of the company the call for service, whether by telephone or in person, is followed by a letter, signed by an officer of the company, welcoming him to the city, pointing out some of its advantages, and expressing the hope that the services of the company will be found satisfactory. The letter is followed by another, one year later, signed by the president of the company, reminding the customer of the first letter and telling him that he hopes he has found Kansas City and the services of the Kansas City Power & Light Company all that he desired.

If one simple policy can ever cover the complex phases of public relations, the policy of the Kansas City Power & Light Company can be said to be "Treat every customer fairly and alike."

•

## Dealer Contests Planned by Washer-Ironer Group

Contests planned to give dealers everywhere an equal chance at winning cash prizes will be the highlight of this year's observance of National Washer-Ironer Week, October 14-21, to be sponsored by the American Washer and Ironer Manufacturers' Association.

Competition will be in three divisions and dealer cash prizes, ranging from $200 to $25 in each contest, will be awarded for the display windows best typifying the advantages of household washer and ironer use. "With the industry generally reporting 30 per cent increase in this year's shipments over 1938 figures," said J. R. Bohnen, executive secretary-treasurer of the association, "we expect the October event to show even greater proportionate gains."

John M. Wicht, sales manager of General Electric's home laundry equipment division, is chairman of a special committee appointed to arrange utilities' cooperation with the industry.

•

## Leonard Sales Up 252%

For the sixth consecutive month sales of Leonard electric refrigerators, as reflected in factory shipments, showed unusually large gains, according to Ray Legg, general sales manager of the Leonard division of Nash-Kelvinator Corp. July sales were up 252 per cent over the 1938 month.

OSMOPLASTIC GROUNDLINE TREATMENT

Photo shows employee of Pennsylvania Power & Light Co. groundline treating a pole with Osmoplastic. Over 25,000 poles treated by this property to date.

***Is Extending Service Life of Standing Poles for 50 Leading Utilities!***

ACTUAL field experience of America's leading utilities proves that Osmoplastic Groundline Treatment checks decay and extends service life of standing poles. Treatment is as simple as A-B-C and costs only $1 to $2 per pole; one additional year of service life pays for Osmoplastic treatment, which extends the pole's service life at least 7 to 10 years. Write for complete details on this effective but inexpensive treatment which is saving substantial sums for utilities throughout the nation.

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**LOWER WATT LOSS . . .**
WITH THIS
**FAMOUS TRICO COMBINATION**

**TRICO *Powder-Packed* FUSES**
The renewal element is different—it's **self-contained, powder-packed,** positively **tamper-proof,** and **non-interchangeable** with ordinary "bare-links". The powder packing **reinforces** the fusible link—it cannot sag, stretch, or weaken.

**KLIPLOK CLAMPS**
Lock fuses and clips together. Eliminate burnt fuses and clips—unnecessary shutdowns and wasted current caused by over-heating. A size for every clip. **USE KLIPLOKS EVERYWHERE!**

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GETTING ALONG WITH PEOPLE
by MILTON WRIGHT

## Dividends From Fair Lighting

[*Continued from page 51*]

stricted to warm climates and summer use in northern parts of the country. The light is sensitive to low temperature. It is expected that this restriction will soon be removed.

Ultraviolet light sources are used outdoors for the first time on a large scale to excite luminescent paints with very interesting results. For example, in the Court of the Seven Seas there are sixteen large niches depicting submarine life in bas-relief. Luminescent paints are applied to the bas-relief and excited by sixteen 100-watt red-purple bulb ultraviolet lamps in Alzak-treated aluminum reflectors concealed at the base of each niche. Research work on the part of the manufacturers of these paints has resulted in a product which withstands the ravages of the elements comparatively well. However, the application of this effect is limited to situations favorable for viewing surfaces of low brightness.

The soft effect of moonlight is produced by the third new light source used on Treasure Island. This is the high-intensity mercury lamp used to illuminate the trees and shrubbery. The lamp, of the 250-watt size, is housed in an Alzak aluminum floodlight, equipped with a transformer and placed in a cylindrically shaped container which is buried in the ground. The use of this mercury floodlight should do much to promote the illumination of trees and shrubs in parks and gardens.

The incandescent floodlight still assumes the major rôle in modern decorative outdoor lighting because the incandescent lamp lends itself to dimming, color correction and control of the light distribution. On Treasure Island the outer walls and setbacks are lighted by incandescent floodlights installed in trenches concealed by trees and shrubs and behind the parapets. Outside walls of the various exhibit palaces are similarly illuminated. Incandescent floodlights with amber, red and blue lenses are used in a mobile lighting scheme for the great metal prayer curtain behind the 85-ft. statue of Pacifica in the Court of the Pacific. Another mobile color arrangement employs incandescent floodlights with colored lenses for the under-water illumination of the large center bubble in the fountain in this court.

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*Solder and Solderless . . . low cost absolute protection to ground wire connections*

Sherman Rigid Ground Fittings are made from heavy malleable iron and rustproofed by a special process to insure long, dependable service. All screws have slotted hexagon heads and are equipped with lock washers. These fittings are easy to install as clamping screws need not be removed, they are adjustable to any position, and pipe clamp may be reversed for use with ground rod. There's a style for any requirement. Send for Bulletin No. 12.

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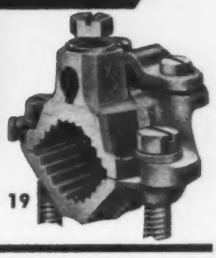

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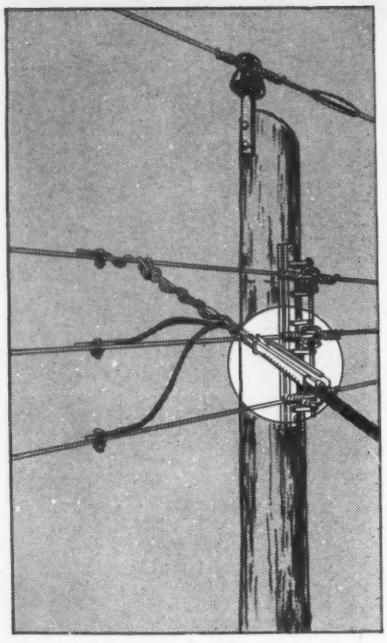

Residential area construction — showing single phase primary with attachment of service cable a couple of feet from pole to high strength common neutral wire.

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hold cable securely without bending or snubbing or otherwise damaging the insulation. Non-corrosive materials — easy to install — low in cost.

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## Sales Opportunities

NEW LONDON, IOWA—Town clerk receives bids until August 22 for extensions and improvements in municipal electric power plant, including installation of new 400-kw. steam turbine-generator unit (Section 1), surface condenser, complete with circulating water pumps, condensate pumps and accessory equipment (Section 2), induced draft type cooling tower (Section 3), and one boiler unit with capacity of 14,000 pounds per hour, complete with setting, stoker and stoker accessories, control instruments, etc. (Section 4). Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

CINCINNATI, OHIO—United Biscuit Co. of America, Inc., 1041 West Harrison Street, Chicago, Ill., plans installation of motors and controls, conveyors, loaders and other equipment in new branch plant at Ariemont, a suburb of Cincinnati, where tract of about 15 acres of land has been acquired. A power house will be built. Cost estimated over $1,500,000.

MILWAUKEE, WIS.—Wisconsin Electric Power Co. addition to steam-electric generating station on Commerce Street for expansion in steam division, consisting of a two-story and basement wing extension, 79x135 feet, about 100 feet high, with new reinforced-concrete stack. A portion of new structure will be used for general station service. Additional equipment will be installed.

HAZARD, KY.—Kentucky & West Virginia Power Company, Hazard, plans extensions in lines in conjunction with acquisition of system of Southern Public Service Company in Kentucky, for which negotiations are being concluded. Application has been made for permission to acquire property noted.

ALAMEDA, CALIF.—Bureau of Yards and Docks, Navy Department, Washington, D. C., closes bids on August 23 for power plant building at naval air station, Alameda, recently referred to in these columns (Specifications 8990).

GENOA, WIS.—Tri-State Power Co-operative, Inc., Rivoli Building, La Crosse, Wis., has approved plans for about 185 miles of 34,500-volt transmission lines in parts of Vernon, Monroe, Grant, Crawford and Lafayette Counties, including two outdoor type, stepdown power substations, and will proceed with work soon. Lines will be used for power supply to a number of rural electric organizations, affiliated with Tri-State Co-operative, from new steam-electric generating plant to be located on site near Genoa. Wisconsin Development Authority, Tenney Building, Madison, Wis., is engineer for transmission lines in Wisconsin; and Young & Stanley, Inc., Muscatine, Iowa, engineer for lines to be built in Iowa and Minnesota. A. Y. Taylor & Company, Clayton (St. Louis), Mo., are consulting engineers for power plant. Entire project will cost about $1,500,000. Financing has been arranged through Federal aid.

MANITOWOC, WIS.—Public Utilities Commission, W. C. Staeffler, assistant secretary, receives bids until August 24 for new 10,000-kw. steam turbine-generator unit, with condenser and complete auxiliary equipment, for installation in municipal electric power plant.

SOMERVILLE, TENN. — Town Council plans extensions and improvements in distributing system of Interstate Utilities Company, for which negotiations are now under way for purchase, including lines extending beyond town limits to several neighboring communities.

BUFFALO, N. Y.—Buffalo Niagara Electric Corporation has approved plans for new power substation on Elmwood Avenue and will begin construction in August.

INDIANAPOLIS, IND.—Allison Engineering Co., Speedway City, Indianapolis, manufacturer of aircraft engines and parts, plans installation of motors and controls, switchgear, conveyors and other equipment in new one and two-story addition, 138 x 155 feet, to be used as a testing laboratory. Work will begin at early date. Cost close to $200,000. This is part of a $5,000,000 expansion and improvement program to be carried out at this plant, previously referred to in these columns. Company is a division of General Motors Corporation, General Motors Building, Detroit, Mich.

NEVADA, MO.—City Council is considering report received from William Spann, Interstate Building, Kansas City, Mo., consulting engineer, recently engaged to make surveys and estimates of cost for proposed municipal electric power plant, recommending a station with initial capacity of 1500-kw. Entire project will include distribution system, power substations and other facilities, and is estimated to cost about $450,000.

WESTMONT, ILL.—Western United Gas & Electric Co., Aurora, Ill., has plans maturing for new power substation at Westmont, for which bids will be asked soon for general erection. Distributing lines will be extended in that district in conjunction with new station.

PORT HENRY, N. Y.—Republic Steel Corp., Cleveland, Ohio, plans installation of motors and controls, conveyors, loaders, electric hoists and other equipment in new ore concentration plant at Port Henry, to be operated in conjunction with local iron ore-mining properties of company. It will be equipped for initial capacity of about 500,000 tons per annum and is scheduled for completion late next fall. Cost reported over $200,000.

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## Interlocking Hearing Set

Continuing its detailed scrutiny of interlocking directorates, the Federal Power Commission has ordered that 25 applicants for authority to hold various interlocking positions shall each, at a public hearing to be held on August 31, make further showing that neither public nor private interests will be adversely affected by reason of his holding the positions applied for within the purview of Section 305(b) of the Federal Power Act. The applicants hold positions in the International Hydro-Electric System.

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## RFC Disbursements to REA

During June the Reconstruction Finance Corporation made a disbursement of $85,350,000 to the Rural Electrification Administration, bringing the total disbursements to date to $146,500,000. Repayments by the REA to the RFC to date amount to $2,425.